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United States Circuit Court of Appeals

FOR THE NINTH CIRCUIT.

HASSAM PAVING COMPANY and OREGON HASSAM PAVING COMPANY,

Complainants-Appellees,

vs.

CONSOLIDATED CONTRACT COMPANY and PACIFIC COAST CASUALTY COMPANY,

Defendants-Appellants.

APPEAL FROM THE UNITED STATES DISTRICT COURT OF OREGON.

BRIEF FOR COMPLAINANTS-APPELLEES.

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Statement of the Case.

This case is a patent suit based on three United States letters-patent granted to Walter E. Hassam, No. 819,652, dated May 1, 1906, Pavement and Process of Laying the Same; No. 851,625, dated April 23, 1907, Process for Laying Pavement; No. 861,650, dated July 30, 1907, Artificial Structure and Process of Making the Same. The patents are stated in the order in which the applications therefor were filed, and are known in the record as the "Hassam First, Second and Third Patents." These patents cover the well-known "Hassam Pavement."

The suit involves claim one of the first patent; claim two of the second patent; and all four claims of the third patent.

The first patent covers the principal invention and the second and third patents cover improvements thereon. There is no question but that the invention and improvements of the three patents can be combined in one pavement, and have been so combined and used, both by complainants and defendants.

The amended bill of complaint was filed in April, 1912. Answer was filed, proofs were taken by deposition, and the case argued before His Honor, District Judge ROBERT S. BEAN.

Defendants admitted infringement of the first and third patents, and only raised a quibble in regard to infringement of the second patent.

The main defense was an attack upon the validity of the patents based on certain prior patents, prior publications and alleged prior uses.

His Honor, Judge BEAN, filed an opinion, holding that the defenses were not maintainable. This opinion is reported, Volume 215 of the Federal Reporter, pages 114–117. By some oversight, this opinion is not printed in the record. It is added as an appendix to this brief for the convenience of this Court.

In pursuance of this opinion, the usual interlocutory decree for injunction and account was entered April 27, 1914, Record, page 367. Defendants have appealed from this decree.

As the testimony was taken and printed largely before the new Equity rules went into effect, by agreement of counsel, the record in the lower Court has been certified as the transcript.

Defendants' assignments of errors are general in their nature and need not be considered *seriatim*.

The substantial issue before this Court is the validity of the patents in suit, in view of the evidence adduced by the defendants.

Statement of Facts.

The inventor, Walter E. Hassam, served sixteen years as Assistant Engineer in the City of Worcester, Massachusetts, having charge of road construction ; and three years as Street Commissioner, having complete charge of streets. The invention of the first patent was developed as a result of this experience, in the effort to solve the recognized defects of the prior methods of pavement construction.

After Mr. Hassam obtained his principal patent, May 1, 1906, he resigned from the employ of the City of Worcester, June 23, 1906, and interested some business men in himself and in his inventions. The complainant, Hassam Paving Company, was formed on the basis of Mr. Hassam's patent, and efforts were commenced to introduce the pavement on its merits.

The pavement turned out to be a great success. When Mr. Hassam testified in June, 1912, after about five years of business, Hassam pavement had been adopted in more than sixty cities in the United States and Canada, reaching from Portland, Oregon, to Portland, Maine (A. 8, page 84). Over three million yards had been laid, representing over six million dollars' worth of road construction. Its durability and low cost made it of great value (page 83).

A striking illustration is the Long Island Motor Parkway built for William K. Vanderbilt Associates, which is familiarly called "the Vanderbilt Race Course." Hassam pavement, after investigation by the Vanderbilt engineers of all kinds of constructions suitable for the great wear and tear of automobile racing, was adopted without competition (Hassam, A. 14–16, page 86).

Hassam pavement has been laid in locations where it has been impossible to use other kinds of pavements (Hassam, A. 12, page 85). It is standing up to automobile traffic better

than any pavement known for the price (Hassam, A. 13, page 86).

Mr. Thomas, the treasurer of the Hassam Company, testified in rebuttal, that the business of the Hassam Paving Company and its licensees is increasing very rapidly. The business of the Hassam Paving Company more than doubled during the year 1913. The Connecticut Hassam Company quadrupled its business. The State of New York in 1913 adopted Hassam pavement for seventy-five miles of state highway. The State of Maine has adopted and is using it. No such success as this could be achieved in five years unless Hassam pavement filled a long felt want.

Over a million dollars has been invested by the Hassam Paving Company and its subsidiary companies to carry on the business of laying Hassam pavement (pages 251-252).

This investment and introduction of the invention into public use has been made by reason of the patents granted by the United States Government. The introduction of the Hassam pavement has given municipalities a better and cheaper pavement for roads having heavy traffic than they ever before had. These municipalities have been glad to adopt the Hassam pavement at the price asked in competition with all other kinds of pavement. Hassam pavement has taken its place in the world as a new kind of pavement and its merit is universally recognized. The patents in suit took nothing away from the public, which was understood or practiced before. Mr. Hassam's inventions have assisted greatly in solving the difficult problem of constructing cheaply, a pavement which will stand heavy teaming and automobile traffic.

Hassam pavement is well adapted for cities and suburbs having heavy traffic on their roads and where the soil or geological formation is soft and porous.

Hassam pavement was introduced into the City of Portland, Oregon, and was found particularly well adapted to the

needs of that city. In the year 1908, one-half mile was laid; in the year 1909 four miles were laid; in the year 1910 thirteen miles were laid, and in the year 1911 twenty-nine miles were laid, or in other words, forty-six and one-half miles, representing 788,000 square yards were laid in the City of Portland in four years (Record, page 303, A. 22, page 88).

As it is difficult to handle a pavement business by one company, Hassam pavement has been introduced by organizing licensee companies who are given the exclusive right to use the patents under royalty for certain territory. The Oregon Hassam Paving Company, co-complainant, was organized for this purpose and has the exclusive license under the Hassam patents for the State of Oregon and part of the State of Washington. It pays 15c. per square yard as royalty on Hassam pavement (page 277).

The bill, Paragraph XXIII., charges the defendants generally with infringement of said patents in the City of Portland. Paragraph XXIV. alleges that the defendants have been notified of their infringement and that they have continued after such notice to infringe the three patents. Paragraphs XXV., XXVI. and XXVII., charge a particular infringement by these defendants in laying Hassam pavement in Commercial Street in the City of Portland. Paragraph XXVIII. charges a disturbance of the relations between the City of Portland and complainants by reason of threats of defendants to commit further acts of infringement.

The facts concerning the particular act of infringement are as follows: The Council of the City of Portland on April 7, 1910, by an ordinance, signed by the Mayor on the fourth day of May, 1910, approved Hassam pavement and it was provided by said ordinance that said Hassam pavement when laid on the streets of the City of Portland should be according to certain specifications (pages 19–22). These specifications are the identical specifications which complainants have evolved from experience to practice the inventions of the

three patents in suit. In February, 1911, said City Council adopted a resolution declaring its purpose to pave Commercial Street in said city with Hassam pavement and said specifications and notice were published, posted and advertised as required by law. No remonstrance or petition against such ordinance or intended improvement was encountered. As the by-laws of the City of Portland are drawn, any contractor or concern interested in the paving business could have come forward at this time and offered its own pavement if it desired to obtain the job. Neither defendants nor any one else did this. The contract was then advertised for the lowest bidder and in the contract it was particularly specified that "Hassam pavement" was to be laid. The defendant, Consolidated Contract Company, then came forward and underbid complainants and obtained the contract for laying the Hassam pavement in Commercial Street. The defendant, Pacific Coast Casualty Company, is a bonding company which backed up the Consolidated Contract Company in obtaining the contract to lay Hassam pavement in Commercial Street.

Defendants then went ahead and laid Hassam pavement in defiance of the patents and complainants' interests, and without making any arrangement with complainants for a license.

The answer attempts to justify said particular infringement on the allegation that the Consolidated Contract Company has a license to use complainants' patents without royalty, because the City of Portland was led by the Oregon Hassam Paving Company to specify that Hassam pavement could be laid within the municipality and that the ordinances of the City of Portland require that all paving contracts shall be given to the lowest responsible bidder, and that it obtained the contract by underbidding complainants. By appropriating complainants' patents and by refusing to pay royalty, of course defendants can underbid complainants.

The Consolidated Contract Company knew that it was figuring on Hassam pavement because Hassam pavement was

called for by name in the specification (page 29). If this defendant wanted the job, it should have specified a pavement of its own and objected when the specifications of Hassam pavement were published for approval for Commercial Street. If it wanted to figure on laying Hassam pavement, it should have arranged with the owners of the patents for a royalty.

If the contention that the City of Portland has a license under the Hassam patents, and that the defendants can seek refuge under such license is maintainable, there would have been nothing left for the Court to have done but to have ordered the defendants to pay over the royalties to complainants, because a defendant justifying under a license cannot question the validity of the patents.

Kinsman vs. Parkhurst, 18 Howard, 289.
United States vs. Harvey Steel Co., 196 U. S., 316.

It would be preposterous to allow defendants to justify under an existing license and escape the payment of royalties due under the license by attacking the validity of the patents.

Moreover, infringement of a patent is not a damage that can be measured in dollars and cents. An infringement not only deprives the complainant of the business which belongs to it under the patent, but may ruin the good-will of the business and encourage others to infringe.

Warren Bros. Co. vs. City of Montgomery, 172 Fed., 414–423 (Circuit Court, M. D., Alabama, N. D., August 9, 1909).

Jones, District Judge :

> " nor can complainant be turned out of the equity court here, on the theory that, having established a royalty, a recovery at law will be adequate compensation, and the injury cannot be irreparable in such sense as to give it a standing in a court of equity. Irreparable injury, in the sense here used, does not necessarily mean that complainant will be ruined or grieviously harmed, if the court of equity does not intervene, but only that some legal right of complainant will be

illegally taken from it, which in equity and good conscience, it is entitled to enforce, the proper and full enjoyment of which will be impaired or lost, if the court of equity declines to interfere and puts complainant to its action at law for damages.

"A large element in bringing a patent into use and giving it a market value is the estimate of the public as to its utility, and whether persons who deal in the process or manufacture believe the same result can be effected under another process, to be had by dealing with other parties at less cost. The completed work here would advertise itself, in most effective form, as a pavement of equal merit to that covered by the Warren patent, laid down and used in defiance of the rights of the patentee, in the capital of the state, where it would inevitably attract attention as the work of a competitor who offers to furnish the process at less cost than it could be had under the patent. At this time, perhaps, more than at any other period, states and municipalities are concerned in building roads and streets and as to the best methods of construction. It is difficult to see how far the failure of complainant to seek injunctive relief to prevent the building and use of such pavement would affect the value of its patents or diminish the number of licenses to use it. The reputation of a patent, like the good name of an individual, is easily injured, and it is hard, no matter how wrongful the injury, to counteract its effect. An ounce of prevention is worth a pound of cure. The full damage which might be inflicted upon the patentee, under such circumstances, if the patent be in fact infringed, is largely speculative, cannot be accurately ascertained, and, therefore, cannot be recovered at law. Equity alone can give an adequate remedy."

Judge Bean aptly disposed of this preliminary question as follows:

"The fact that the city of Portland saw fit to specify Hassam pavement for one of its streets at the request

> of the holder of the patent, does not excuse one who underbid the owner of the patent for an infringement thereof any more than if the owner of a rock quarry should induce the city to specify rock for use in a street of a quality to be obtained only from his quarry would justify the successful bidder in appropriating the rock without paying for it."

This preliminary defense raised by the defendants is also immaterial in view of the proofs. During the taking of the proofs, it appeared that not only has the defendant, Consolidated Contract Company, laid Hassam pavement on Commercial Street, in the city of Portland, but that it has laid 28,950 yards of Hassam pavement on Milwaukee Street, a stretch on Gantebein Avenue, a piece on Union Avenue, and a short piece of five or six blocks on East Yam Hill and Macadam Street (page 189). The stretch on Gantebein Avenue was completed before this suit was commenced (page 190).

Said defendant does not attempt any specific justification for its infringing acts on any street outside of Commercial Street. The infringement on Gantebein Avenue was completed before the bill of complaint was filed. Union Avenue, East Yam Hill, and Macadam Street were laid with Hassam pavement, commencing before, and continuing during the progress of this litigation.

The defendant, Consolidated Contract Company, therefore, is a rank infringer, and has continued its acts of infringement just as long as it could until enjoined in this case. Not only has it taken complainants' patents, but it has appropriated its name and good-will and held out that it was prepared to lay " Hassam pavement."

This defendant has been guilty, not only of patent infringement, but of unfair competition in trade.

Defendants' main defense is ~~on~~ an attack on the validity of the patents in suits based on old patents, publications and alleged prior uses, a large part of which evidence relates to

descriptions of roads which on test proved to be utterly impracticable and which have been forgotten, and which patents, publications and abandoned experiments are now resurrected by the defendants to enable them to have some handle to their argument, that the meritorious patents involved in this controversy should be confiscated.

This defense, which the infringer so often endeavors to employ as a harbor of refuge, as presented in this case involves a fundamental fallacy. There is no allegation that any one of these prior patents, prior publications or alleged prior uses, *in itself*, constitutes an anticipation of any claim of either of the three patents in suit. The argument is that the Court can find one step or element in one publication, another step or element in another piece of evidence, and so on, and that there would be no invention in combining the various elements or steps in one combination or to make one pavement. Such a defense often carries and certainly does carry in this case, its own refutation. All the prior patents urged by defendants have expired, except the Warren patent on bitulithic pavement, which is not at all like the pavements in controversy. All the concrete pavements of the prior art are open to defendants' use, but defendants pay complainants the compliment of using Hassam pavement and not the prior art pavements. Defendants' conduct, therefore, constitutes cogent evidence in support of the *prima facie* validity of the patents in suit.

Heinz Co. vs. Cohn, 207 Fed. Rep., 547–560, C. C. A., 9th Circuit:

> " Beyond this, the presumption of novelty attending the issuance of letters patent, the general and extensive use to which the new device is applied, and *further the use persisted in by one infringing the device are all evidence of the product of inventive faculty and genius.* Diamond Rubber Co. vs. Consol. Rubber Tire Co., 220 U. S., 428, 31 Sup. Ct., 444, 55 L. Ed., 527; A. R.

Milner Seating Co. v. Yesbera, 133 Fed., 916, 67 C. C. A., 210; Buchanan v. Perkins Electric Switch Mfg. Co. 135 Fed., 90, 94, 67 C. C. A., 564; Morton v. Llewellyn *et al.*, 164 Fed., 693, 90 C. C. A., 514."

A decision against the validity of the patents here in suit will make complainants' large investment of no value. Before any court will strike down and declare the patents in suit invalid and void, to the use of an infringer, it must be satisfied beyond reasonable doubt that the defendants are right. The patent laws of the United States were founded and enacted to encourage just such inventions and developments as complainants' rights represent in this case.

San Francisco Cornice Co. vs. Beyrle, Circuit Court of Appeals, Ninth Circuit, 195 Fed. Rep., 517.

> " With respect to the first defense, the rule is that the burden of proof is upon the defendant to establish this defense, for the grant of letters patent is *prima facie* evidence that the patentee is the first inventor of the device, or the discoverer of the art or process, described in the letters patent and of its novelty. Smith v. Goodyear Dental Vulcanite Co., 93 U. S., 486, 489, 23 L. Ed., 952; Lehnbeuter v. Holthaus, 105 U. S., 94, 26 L. Ed., 939. Not only is the burden of proof to to make this defense upon the party setting it up, but it has been held that *every reasonable doubt should be resolved against him.* Cantell v. Wallick, 117 U. S., 689, 695, 6 Sup. Ct., 970, 29 L. Ed., 1017."

The Proofs.

Complainants endeavored to assist the Court in every way to a correct understanding of the issues. In the opening proofs, Mr. Hassam was called to the stand and explained succinctly the details of his invention. Harold Parker, probably the most eminent authority on road construction, was called and explained clearly the differences between the

Hassam pavement and the old pavements. Mr. Parker was formerly Chairman of the Massachusetts Highway Commission. He built all the State Highways in Massachusetts. He is now first vice-president of the Hassam Paving Company. He resigned from the Massachusetts Highway Commission and became connected with the Hassam Paving Company, because from experience he was satisfied of the superiority of the Hassam pavement (page 106).

Defendants, in proving the prior art, simply dumped four prior patents and seven excerpts from dictionaries, encyclopedias, text books and publications in evidence and called certain witnesses in the attempt to show prior uses. No expert was called to explain these patents or printed publications or alleged prior uses.

Complainants, in rebuttal, had the well known expert, Arthur S. Browne, discuss these prior patents and publications and prior uses, and show where they are absolutely immaterial and without relevancy to the patents in suit; and also had Professor French of the Worcester Polytechnic Institute conduct a series of tests to determine the strength of the Hassam pavement foundation to resist crushing strains and also bending strains, as compared with the strength of cement concrete previously employed in road building.

As defendants' contentions, with regard to the validity of the patents in suit based on these prior patents and publications, are not clearly brought out in the evidence, considerable discussion of these matters seems necessary.

Road Construction.

Speaking generally, a road is made of two parts.

First, a foundation designed to carry the load, that is, to resist the crushing and bending strains of traffic; and, second, a top or wearing surface formed or placed on said foundation and designed so that the feet of horses can engage the same

and so that at the same time the wheels of vehicles will pass easily thereover.

A new factor has recently been encountered, because roads have to be designed so that the wheels of automobiles will obtain a grip or traction on the wearing surface, which at the same time must allow a smooth passage of the automobile, but not be slippery enough to allow side skidding.

Road Classification.

Speaking generally,roads may be divided into three classes. First, ordinary dirt or country roads ; second, Macadam or loosely united stone roads ; and third, pavements.

I. The Ordinary Dirt Road.

The ordinary dirt road is made by grading or levelling a road with materials directly at hand and usually rolling the same. These roads are generally prototypes and their improvement and condition represent the progress reached by the community in which they are found. They need not be discussed in this brief.

II. Macadam or Loosely United Stone Roads.

This class of roads is constructed of broken stone and the principle employed is entirely a mechanical binding of the pieces of stone together. This road was devised by a Scotchman and is named after its inventor. It is well described in the article read into the record, on page 156, from the Century Dictionary :

> " Macadamization :
>
> " The process of laying carriage roads according to the system of John Loudan Macadam, Scottish engineer (1756–1836), who carried it out very extensively

in England. In the common process the top soil of the roadway is removed to the depth of 14 inches. Coarse, cracked stone is then laid in to a depth of seven inches and the interstices and surface depressions are filled with fine cracked stones.

"Over this is placed a bed laid seven inches deep of road metal or broken stone of which no piece is larger than two and one-half inches in diameter. This is rolled down with heavy steam or horse rollers and the top is finished with stone crushed to dust and rolled smooth."

From the above description, it will be seen that the stone particles are held together mechanically and that the structure depends for its stability upon the dust and fine particles of stone being forced into the spaces between the pieces of stone, something like the way a stone wall is built up in a pasture, of large pieces of stone, with little pieces inserted in the spaces.

An interesting discussion of the theory of the construction of this road is found in Baker's Treatise on Roads and Pavements, extracts from which were read into the record (pages 168–181). Baker states as follows (page 170) :

> "The inference drawn from such results would be that cementation in such materials is to a considerable extent mechanical,—that is, the interlocking of the fine particles of dust caused by pressure."

Any binding action which occurs is extremely slight. Baker compares it to the "drying up of particles of water on clayey soil."

Baker further describes the binding as follows (page 171) :

> "This binding action is quite slight, but may have an appreciable effect in maintaining the delicate adjustment of a broken-stone road."

A modified form of Macadam road is known as Telford. A Telford road consists of a foundation formed by first laying

heavy flags or stone in the road bed and then placing a Macadam road on such foundation. A Telford road is described on page 158 of the record as follows :

> " The turnpike roads were generally managed by ignorant and incompetent men until Telford and Macadam brought scientific principles and regular system to their construction and repair. The name of Telford is associated with a pitched foundation, which he did not always use, but which closely resembled that which had been long in use in France, and the name of Macadam often characterizes roads on which all his precepts are disregarded. Both insisted on thorough drainage and on the use of carefully prepared materials, and adopted a uniform cross section of moderate curvature instead of the exaggerated roundness given before; but, while Telford paid particular attention to a foundation for the broken stone, Macadam disregarded it, contending that the subsoil, however bad, would carry any weight if made dry by drainage and kept dry by an impervious covering."

It is obvious that the slight mud-puddle binding obtained in a Macadam road would not be of much use in a road which has to stand heavy traffic. A Macadam road is well adapted to long stretches in the country, where it is desired to construct a stone road cheaply. There are many miles of such roads in use in England and the United States, but it will be found that such roads are rarely carried into cities and suburbs where heavy traffic is conducted and where the Hassam pavement has remarkably fitted in. A Macadam road has little bearing on the issues of this controversy, but is interesting as a matter of history.

III. Pavements.

As the term " pavement " is usually employed, it has relation to a road made of stone or brick or wooden blocks, or

solid structures. Such roads are designed for the heavy traffic encountered in cities, suburbs, main or state highways, and places where the ordinary country or dirt roads and Macadam roads will not serve.

Pavements may be divided into three general types :

First, a pavement consisting of blocks of stone, brick or wood laid on the road with only a light, or practically no foundation under them. These pavements are usually found to be the first attempts of cities and municipalities to build streets to stand heavy traffic. After use they are usually found to be rough, uneven and poor. They are being rapidly replaced throughout the United States. They have little bearing on this controversy.

Second, a pavement constructed of cement concrete ; that is, of small pieces of stone permanently united and held together by cement. This litigation relates to a pavement made of cement concrete.

The first Hassam patent relates in particular to a new cement concrete foundation for a pavement, upon which foundation a suitable wearing surface is placed. The second patent relates to an improvement in the process of constructing said foundation. The first three claims of the third patent relate to a pavement having the improved cement concrete foundation and an improved wearing top surface united therewith ; and claim four covers the process of building the complete pavement.

Third, pavements made of bituminous compounds.

Bitumen is a mineral pitch, which will become plastic *under heat*, and some varieties of which will burn. Bitumens vary greatly in consistency from liquid naphtha to solid asphaltum. A pavement made of bitumen is often spoken of as an "asphalt pavement."

It is desired at this point to emphasize the distinction between a *concrete* pavement and a *bituminous* pavement. Con-

crete consists of pieces of broken stone held together by cement. The stone gives the structure its strength. The cement binds the pieces of stone together. The larger the proportion of stone employed in a given thickness, provided the binding action of the cement is perfectly retained, the stronger will be the concrete. The making of concrete depends upon the setting of the cement, which is a process of hydration, or a chemical action. It has no relation at all to heat. Concrete can be made at any temperature above the freezing point. A perfectly made concrete pavement has the same density at all temperatures.

A pavement made out of bituminous compounds is very different, both structurally and chemically. Bituminous compounds are mixed in hot condition and set into a solid condition by cooling. *Heat* is the essence of the use of bituminous compounds. The difficulty of working sticky, hot bituminous compounds, or tars or pitches with broken stone will be obvious upon reflection. While, of course, good pavements are made out of bituminous compounds, for certain uses and locations, particularly where strength is needed, they are not comparable with Hassam pavement. In hot weather, a bituminous pavement will become soft. The feet of horses will spoil the surface thereof, and narrow tires will cut it up. Traction on a warm bituminous pavement is increased as the wheels sink into it. Moreover, bituminous compounds have in themselves an element of destruction, in that the ingredients tend to crystalize and undergo chemical disintegration, and thus bituminous compounds after a certain time become non-efficacious to keep the structure together.

On the other hand, perfect concrete is a structure which will last beyond the uses of man. The concrete in the Coliseum at Rome is said to be stronger to-day than when built.

The patents in suit are directed to the problem of making

a *perfect* cement concrete pavement, as distinguished from a bituminous pavement. Mr. Hassam says in his first patent :

> " I have found that roads made of bituminous compounds after a certain period disintegrate, and are expensive to repair. * * *
>
> " No bituminous material is used in my method of construction of road, but only broken stone or gravel, sand and cement."

The case best can be considered by presenting the subject matter entirely within its proper confines. The ordinary country roads and the Macadam roads have nothing in common with the subject matter to be discussed.

Foundations and pavements made out of bituminous compounds worked hot can also be disregarded, as they are not at all relevant.

The case at bar is concerned entirely with a cement concrete foundation and with a pavement having a cement concrete foundation and an improved wearing surface.

Therefore, the patents in suit will be considered in connection with the relevant prior art.

The Ordinary or Old Cement Concrete Road Foundation.

The method employed for making a cement concrete foundation for a road, before the invention of the patents in suit, is well described by Professor French in his Answer 3, page 240 :

> " A. If the concrete is to be mixed by hand, the ordinary method employed is to put the desired amount of cement and sand on a mixing board. These may be mixed together dry, but more usually this mass is soaked with water and thoroughly mixed with shovels. Then the desired amount of crushed stone is added and the mixing is continued by shoveling until each piece

> of stone is coated as nearly as possible with cement, sand and water. Sometimes a machine mixer is employed in which the cement, sand, rock and water are put in together and then the ingredients mixed to get the same result, namely, as thoroughly as possible coating of the broken stone with mortar composed of cement, sand and water. This material prepared in this way is then shoveled on the roadbed and given the desired grade and level. Sometimes it is simply spread and left on the road. In other instances it is tamped by workmen using hand tampers. I have never seen a steam roller employed for this purpose and believe great difficulty would be found in attempting such a step, owing to the slippery, unstable condition of the mass. The mixture is allowed to stand in the roadbed the necessary length of time, usually a number of days, until it sets into a hard, so-called concrete."

In brief, the old method consisted in coating the broken stone with cement and sand in a trough or in a mixer at one side of the road, then taking the coated stone, placing it on the road and tamping or ramming the same by hand.

This process led to a very inferior cement concrete. The Court can well understand that the pieces of stone might not be properly coated with cement, that the cement is partially set before the coated stone is put upon the road, and that there is no surety that the voids are filled up. Moreover, this old process was expensive, as the stone had to be handled twice, namely, once to coat the same with cement and sand, and a second time on the road. The use of cement concrete for pavements, prior to Mr. Hassam's inventions was rare.

This is clearly explained by Mr. Parker (Page 100) :

> " The reason that I hold this view is that from the nature of things a concrete mixed either by hand or by machine, in the very act of handling, must, owing to the different specific gravity of its ingredients, be more or less separated into its component parts and that therefore, ordinary concrete hauled out and dumped

onto the road is actually separated by the act itself and therefore cannot be uniform in its structure.

" Further, the stone composition or concrete placed on the road and tamped with an ordinary hand-tamper is not, and never can be, uniformly solid in its structure, and many weak places necessarily develop because of the different comingling of the ingredients. This results in an uneven surface and the destruction of the road more or less rapid, according to the skill of the persons laying the concrete.

" Furthermore, it is impossible to lay concrete in the ordinary way, in thin layers on a road, and get the surface smooth and satisfactory."

(See also page 102).

" x-Q. 12. That is, you mean by mixing the concrete on the ground and tamping it or rolling it ?

" A. I mean the ordinary method of laying concrete, which is to mix by hand or machinery and tamp it also by hand.

" x-Q. 13. Would it not be practical to mix on the ground by having a sufficient force of men for that purpose, and to follow up immediately with a heavy roller and roll the concrete instead of tamping it by hand ?

" A. My judgment is, and that is based upon observation, that hand-mixed concrete placed upon the road and rolled with a roller is absolutely unsatisfactory.

" x-Q. 14. Would it be any better if it were machine mixed and then rolled with a heavy roller ?

" A. No, sir."

The imperfection of the ordinary cement concrete pavement is not at all disputed and is clearly stated in Mr. Hassam's first patent (page 1, lines 26–55).

" Roads constructed of concrete or *stone and cement* mixed before they are laid also crumble and break up in time because the presence of the partly-hardened

cement between the stone when the mixture is laid prevents the stone from being brought close together by compression, but causes comparatively large cement-filled voids to be left between said stone, and said cement soon disintegrates because it was necessarily disturbed in setting by the mixing operation. It is a well-known fact that if cement is left undisturbed until it has entirely set it will be very strong and durable ; but if it is mixed or otherwise disturbed during the time it is setting it will not last. It is therefore essential that the cement used in the construction of roads and pavements be handled and mixed as little as possible and that it be used or laid as soon as possible after it has been mixed. Owing to the employment of unskilled and careless workmen for laying concrete pavement the mixture of stone and cement is often handled more than is necessary, and it is often not laid for a considerable time after it has been mixed. The result is that the majority of this kind of road or pavement laid is even less durable than it would be if constructed under the best circumstances."

The above described method was the ordinary method of making cement concrete, whether used for streets, buildings, bridges or other structures. For reasons given by the witness, it was not satisfactory as a foundation for streets, its structure was insufficient, it was expensive to lay, and although the value of cement concrete was well known, it was used very little for pavement before the inventions of Hassam Pavement.

The First Hassam Patent.

The first Hassam patent, No. 819,652, covers certain new and useful " Improvements in Pavements and Processes of Laying the Same," and at the outset the patent says :

" My invention relates to the making of stone or gravel roads or pavements, and it consists of an im-

provement in the method of making such roads or pavements, as hereinafter described, and particularly pointed out in the claims.

"The object of my invention is to construct a cheaper, more durable, and for many purposes a more efficient road than has hitherto been constructed of broken stone or mixed stone and bituminous or other cement." (Page 1, lines 13–23).

The specification then refers to the disadvantages of bituminous pavements and ordinary cement concrete pavements, and then describes the Hassam pavement foundation as follows:

"No bituminous material is used in my method of construction of road, but only broken stone or gravel, sand, and cement. The street is first dug out to the proper depth for the sub-grade, which is rolled, if needed. Broken stone or gravel is then spread to a proper depth and rolled with a steam-roller or compressed by any suitable means until the voids between the stone are small and the surface even. It will be noted that as there is no coating of cement, bituminous, or other material on the pieces of stone they can be compressed very close together and solid, and the voids left between them will be extremely small. When the stone or gravel has been compressed to the desired closeness and firmness, it is grouted with a mixture of cement, sand, and water, which may not be prepared until immediately before it is to be used, and which does not require excessive handling, like the mixture for concrete, and therefore does not suffer from being handled by careless workmen. All the voids are filled with cement in the grouting operation" (Page 1, lines 56–80).

In accordance with this described mode of operation, it will be noted: (1) that uncoated broken stone or gravel is employed for the foundation; (2) that this uncoated broken stone is spread to the proper depth directly on the road bed

and is then rolled with a steam roller, or otherwise compressed until the voids or vacancies between the stones are made very small ; and (3) after the stone has thus been compressed, it is grouted by pouring a mixture of *cement, sand and water* over the same, which flows into the small voids or vacancies between the broken stone, so that they are filled and the crushed stones thoroughly united.

The specification then goes on to describe the application of a suitable surface to the foundation. It states that after the cement has stood and grown hard and a solid foundation has been obtained, brick, stone or wood block may be placed on the cement to form a wearing surface. It states, however, that it is preferred to make the surface by means of a thicker grout of cement, sand and water and fine broken stone or gravel, the stone or gravel being rolled into grout while it is still green.

The road or pavement which is thus prepared is defined in claim one of this first Hassam patent, as follows :

> "1. A road or pavement consisting of *a bottom layer of hard-rolled uncoated* stone, a *grouting of cement* placed upon said stone and *filling all the voids therein*, and a suitable surface placed on said grout." (Italics added.)

It will be noted, that this claim specifies the particular characteristic of the foundation, including the hard rolled uncoated stone, and the grouting of *cement* filling the voids ; and that it broadly recites the wearing surface, defining it simply as a " suitable surface placed on said grout."

In other words, the " suitable surface " of the claim may be any of the surfaces such as are specifically referred to in the specification, namely, of brick, stone or wood block, or of the fine stone or gravel mixed with a grout of cement, sand and water. The claim is directed to the specific foundation combined with a suitable wearing surface.

The advantages of the Hassam cement concrete foundation are of the utmost importance and are as follows :

First, the entire operation of making the same is conducted directly on the road, no trough, or mixing by labor, or machine mixing being necessary.

Second, as the broken stone is compressed and forced together in clean condition, as thoroughly as possible *in situ*, much more stone relatively to the cement is obtained in the concrete, than by the old method, and hence Hassam concrete is the strongest known.

This rolling with a steam roller, or compression of the naked stone until the voids are small, is an entirely different thing from ordinary hand tamping which merely packs the pieces of stone together. Hard rolling or compression breaks down the sharp edges of the stones and reduces the voids so that they will be extremely small. This step involves a positive compression and breaking down of the pieces of stone on each other.

The effect obtained by this rolling or compressing of the uncoated, naked stone can be realized from the figures.

> "Broken stone material contains about 55 per cent. of solid stone to 45 of void space (page 160).

In building the Hassam foundation, a layer of eight inches of uncoated, broken stone is laid on the road. This is rolled and compressed by a heavy steam-roller until it is six inches in thickness. This involves a reduction of twenty-five per cent. in thickness, and as the only way reduction can take place is by reducing the voids, it will be seen that this action reduces the voids over half, or substantially from forty-five per cent. to twenty per cent.

Third, the grout employed is a mixture of *cement, sand and water* about like soup, which can be poured over the crushed stone very expeditiously and rapidly and will com-

pletely fill the voids left in the stone after rolling. This is done without heating. Substantially, a monolith or a solid stone is built in the street, better even than Nature builds rock.

After the pavement is made, the same is allowed to solidify simply by standing. The cement sets by chemical action and the whole mass is solidly united. The chemical setting action of the cement is a process of hydration, that is, the cement absorbs and chemically unites with a certain amount of the water and solidly binds the pieces of stone together. Heat or temperature performs no function in this hydration. A cement concrete pavement is practically a solid stone and temperature changes do not affect thereafter its stability. Hassam pavement does not become plastic, or warp, or disintegate, during hot weather.

Mr. Hassam's discovery in substance is that a foundation layer of uncoated, clean, broken stone, crushed so that the pieces of stone are in very intimate contact and the voids between the pieces of stone very small and minute can be bound together by a liquid grouting filling these voids, whereby a concrete foundation is produced several times stronger than ordinary concrete. This result is obtained because strength is given to the structure by the crushing of the stones together so that the pieces are inherently stable and in intimate contact and because there is a large percentage of stone in the layer. The little minute voids left between the pieces of stone after the crushing operation are completely and thoroughly filled with the thin grout of cement, sand and water, and the *relatively weak binding character* of the grout is not material because there is no void or space of any size to be filled and the use of grout is many times compensated for by the inherent stability of the pieces of stone crushed upon each other and the relatively great percentage of stone in the layer.

In short, the stone is used for strength and the grout prac-

tically only for binding, which function it performs perfectly by reason of the small size of the voids or spaces between the stones.

To state a homely analogy for illustration, a carpenter gluing two boards together always presses them into intimate contact, so that there is as little glue as possible between the boards, whereby the boards are used for strength and the glue simply for binding purposes. If there should be half an inch of glue between the boards, the structure would be weak.

Mr. Hassam's conception that a concrete foundation could be given strength by increasing the proportion of stone by rolling, and that cement grout could be most advantageously employed for binding, by reason of the resulting small size of the voids, has revolutionized concrete paving.

That a *perfect* concrete pavement could be made by placing a layer of clean, uncoated, broken stone on the road-bed, crushing the same with a steam roller so that the voids will be brought to a minimum and as much stone as possible obtained in the layer, and then pouring a thin liquid grout made up of cement, sand and water thereon so that the grout will permeate and fill the small voids, whereby upon setting, a perfect concrete foundation will be built in the street, which foundation is much stronger than ordinary concrete, and upon which foundation a suitable wearing surface can be placed to make up the complete pavement, was a phenomena which was at variance with the teachings of all text-books and engineers skilled in concrete construction.

Grouting, generally, was a discredited, discarded step, never used if anything else were available, and condemned because the previous results obtained thereby were such that the resulting structure was so unstable and had such inherent weaknesses that it could not be relied upon, as the thin character of the grout gave a weak cementing effect if placed in holes or voids of any size.

Baker states in Volume I, page 136, of his Concrete Construction as follows :—

> " Grout. This is merely a thin or liquid mortar of lime or cement. The interior of a wall is sometimes laid up dry, and the grout, which is poured on top of the wall, is expected to find its way downwards and fill all voids, thus making a solid mass of the wall. *Grout should never be used when it can be avoided.* If made thin, it is porous and weak ; and if made thick it fills only the upper portions of the wall. To get the greatest strength, the mortar should have only enough water to make it a stiff paste—the less water the better." (Italics ours.)

But Mr. Hassam left all precedent behind and discovered that a grout of cement, sand and water could be advantageously employed for a pavement foundation, if small, uncoated, sharp, broken stones were first crushed by a roller and then the cement grout poured in the resulting small voids. Mr. Hassam's invention involved the striking out along a pathway, which had been previously avoided by all concrete engineers.

The Hassam cement concrete foundation is simplicity itself. It is easy to say that it simply consists of a cement concrete made out of small broken stone, by first crushing the same in an uncoated condition and then pouring a grout of cement, sand and water to fill the resulting small voids. Compressing stones by a roller of course was old, and grouting with cement itself of course was old, but no one, prior to Mr. Hassam, saw that a cement concrete foundation for a pavement could be made by combining the two steps in the order stated so that a solid cement concrete foundation would be obtained suitable for receiving a wearing surface. In short, Mr. Hassam's process brought success out of what had heretofore been a failure in road building, namely, the devising of a *cement concrete* foundation for pavement.

By the testimony of Professor French, the Hassam cement

concrete foundation is thirty-three per cent. stronger to resist bending strain, and forty-two per cent. stronger to resist crushing strain, as compared with the ordinary cement concrete. These are the substantial strains a pavement or pavement foundation is put to (Page 245).

The claim of the first Hassam patent covers a new cement concrete pavement foundation made out of old materials in a new way to form improved structure or product. It is the kind of a claim that has been repeatedly approved by the Court, as will be pointed out in connection with patents on pavements which have been before the Courts.

Lamb Knit Goods Co. vs. Lamb Glove and Mitten Co., 120 Fed., 272 (Circuit Court of Appeals, Sixth Circuit) :

> " If it is a useful article, and is new, it is the proper subject of a patent, provided it involves invention to produce it. Gibbs v. Hoefner (C. C.), 19 Fed., 323 ; La Rue v. Electric Co. (C. C.), 31 Fed., 82 ; Seymour v. Osborne, 11 Wall., 516, 549, 20 L. Ed., 33.

The Second Hassam Patent.

The Second Hassam patent, No. 851,625, so far as concerned in this case, is directed to a particular improvement in the method of making the foundation of the first Hassam patent, No. 819,652. Briefly stating, the improvement is as follows :

In building the pavement foundation of the first patent by pouring grout of cement, sand and water on the uncoated, crushed or rolled, broken stone, it was found that air bubbles were apt to be trapped in the foundation. As it is the purpose of the inventions to get as strong a foundation as is possible within a given space, after considerable experiment, Mr. Hassam found that this difficulty could be obviated by agitating or disturb-

ing the layer of crushed, uncoated, broken stone during the process of grouting, until the grout should flush up to the surface, whereby all the voids or spaces between the stone would be absolutely filled with grout and the air traps eliminated.

At the outset the specification of the second Hassam patent states:

> "My invention relates to a process of constructing stone or gravel roads or pavements and it is designed particularly as an improvement on my previous invention patented May 1, 1906, No. 819,652" (Page 1, lines 12–16).

The specification then describes the difficulty previously encountered by Mr. Hassam in distributing the grout of cement, sand and water, so that air would not be left in the voids or spaces in the layer of crushed, naked stone, and states the particular object of the invention is—

> "to lay the ~~payment~~ pavement and particularly the grout in such a manner that all the voids in the stone layer will be filled therewith and no holes will be left in the surface" (Page 1, lines 36–40).

This is accomplished by agitating the cement grout after it is placed upon the stone, so that the air is allowed to escape and all voids filled with grout. As stated in the specifications, for the purpose of agitating the grout, a steam roller is preferably employed "which may be the same used for compressing the stone." This agitating the mass of crushed stone to expel the air so that the grout of cement, sand and water will fill all the voids, is the distinguishing improvement, as compared with the first Hassam patent, and is covered by claim 2.

> "2. The process of constructing a road or pavement which consists in laying a layer of uncoated stone, compressing said stone layer until the voids are small, grouting with a mixture of cement, sand and water,

agitating the mass to expel the air and fill the voids between the stone with said grout, and placing a surface on the mass thus formed" (Italics ours.)

Law on Process Claims.

Process or method claims of this character have been repeatedly sustained by the Courts:

Tilghman vs. Proctor, 102 U. S., 707:

The patent in this case involved the discovery that fat could be dissolved into its free fat acids and glycerine by placing the fat in water, by bringing the water to a high temperature, 400 to 612 F., and by keeping the same under sufficient pressure to prevent the formation of steam, by which process the glycerine and fat acids separated from each other by reason of their different specific gravities.

The claim was

> "the manufacturing of fat acids and glycerine from fatty bodies by action of water at a high temperature and pressure."

The Court sustained this patent as a proper process, saying:

> "That a patent can be granted for a process there can be no doubt. The patent law is not confined to new machines and new compositions of matter, but extends to any new and useful art of manufacture. A manufacturing process is clearly an art, within the meaning of the law."
>
> * * * * * * *
>
> "A process is an act, or a mode of acting. The one is visible to the eye; an object of perpetual observation. The other is a conception of the mind, seen only by its effects when being executed or performed. Either may be the means of producing a useful result. The mixing of certain substances together, or the heat-

ing of a certain substance to a certain temperature, is a process. If the mode of doing it or the apparatus in or by which it may be done is sufficiently obvious to suggest itself to a person skilled in the particular art, it is enough, in the patent, to point out the process to be performed, without giving supererogatory directions as to the apparatus or method to be employed. If the mode of applying the process is not obvious, then a description of a particular mode by which it may be applied is sufficient. There is, then, a description of the process and of one practical mode in which it may be applied. Perhaps the process is susceptible of being applied in many modes and by the use of many forms of apparatus. The inventor is not bound to describe them all in order to secure to himself the exclusive right to the process, if he is really its inventor or discoverer. But he must describe some particular mode, or some apparatus by which the process can be applied with at least some beneficial result in order to show that it is capable of being exhibited and performed in actual experience."

Carnegie Steel Company vs. Cambria Iron Company, 185 U. S., 403.

In this case a process was involved which consisted in placing a large receptacle, called a mixer, between the blast furnaces and converters in a steel mill so that if one blast furnace should produce a faulty charge, by the law of averages its deleterious effect would be mixed with and lost in a large number of perfect charges ; so that, for illustration, instead of producing ninety-nine good rails and one bad rail, one hundred rails each ninety-nine per cent. perfect would be produced. Claim 2 involved in the case was as follows :

" 2. In the art of mixing molten metal to secure uniformity of the same in its constituent parts preparatory to further treatment, the process of introducing into a mixing receptacle successive portions of molten metal un-uniform in their nonmetallic constituents (sulphur,

silicon, etc.), removing portions only of the composite molten contents of the receptacle without entirely draining or emptying the same, and successively replenishing the receptacle with fresh ununiform additions, substantially as and for the purposes described."

The Court sustained the patent saying:

> "It should be borne in mind that this process was one not accidentally discovered, but was the result of a long search for the very purpose. The surprise is that the manufacturers of steel, having felt the want for so many years, should never have discovered from the multiplicity of patents and of processes introduced into this suit, and well known to the manufacturers of steel, that it was but a step from what they already knew to that which they had spent years in endeavoring to find out. It only remains now for the wisdom which comes after the fact to teach us that Jones discovered nothing, invented nothing, accomplished nothing."

Claim two of the second Hassam patent clearly comes within the purview of the settled law.

The Third Hassam Patent.

The third Hassam patent No. 861,650, was co-pending in the Patent Office with the second Hassam patent, and its distinguishing feature consists in the way in which the wearing surface layer is applied to unite with the cement grouted foundation. This third Hassam patent, referring to the first patent No. 819,652, states:

> "The principal object of this invention is to provide for improving the surface layer, and the improved surface layer can be used either with those constructions and methods which involve the use of previously coated stone, or with that which is carried out with uncoated stone afterwards grouted" (Page 1, lines 20–25).

The specification then describes the laying of the broken stone foundation and the application of the cement grout thereto in substantially the same way as in the second Hassam patent, so that the voids are all filled with the grout and the air expelled; but with this difference, that the grouting is one which fills the voids and overflows the foundation. In accordance with the first Hassam patent, the cement used in the grouting operation is allowed to stand until perfectly hard before the wearing surface is applied. In accordance with the third Hassam patent, the wearing surface is applied *while the grout is still fluid and before the cement has a chance to set or harden*, so that the wearing surface material is united to the foundation by the cement grout. In this connection the specification of the third Hassam patent says:

> " In order to produce a suitable surface on top of the pavement or other structure which is being made, uncoated fine or pea stones are rolled into the layer *c before the cement has a chance to set or harden.* The top layer *c* however, may be formed of a mixture of sand, cement, and fine pea stones preferably in substantially equal proportions, and a suitable amount of water and applied to the top of the layer of hard rolled stones " (page 1, lines 53-61).

The claims are as follows:

> " 1. An artificial structure comprising a foundation layer of hard rolled stone, having grouting filling the voids therein and a surface layer *comprising a continuation of said grouting* containing fine stones compressed into its surface.
>
> " 2. A road or pavement consisting of a bottom layer of hard rolled uncoated stone, a grouting of cement placed upon said stone and filling all the voids therein, and a top layer of smaller uncoated stones *compressed into the surface of said grouting before it sets.*
>
> " 3. A road or pavement consisting of a bottom

layer of stone, a grouting placed upon said stone and filling all the voids therein, and a top layer of smaller uncoated stone *compressed into the surface of said grouting before it sets.*

"4. The method of making a pavement which consists in rolling uncoated stone, placing a thin grouting thereupon, allowing the grouting to run down and fill the voids in the layer of stones, and *compressing fine uncoated stones into said grouting before it sets.*"

In brief, the first Hassam patent covers an improved cement concrete foundation for pavements, upon which any wearing surface can be placed.

The second Hassam patent covers a detail improvement in the process or method of making the foundation of the first patent.

The third Hassam patent covers an improved composite pavement made up of a foundation and wearing surface, the foundation being made by the method and improvement of the first and second patents and a wearing surface, consisting of a continuation of the cement grout which binds the broken-stone foundation together, in which fine uncoated stones are compressed before the same sets.

The first three claims of the third patent cover the complete pavement itself, and the fourth claim covers the method of making the complete pavement.

As stated in the first two patents, the foundation can be used with any form of wearing surface applied thereto.

But in actual practice complainants' great success has been made with the complete Hassam pavement, which embraces the inventions of the three patents. As testified to by Mr. Hassam, 80 to 90 per cent. of the business done by the complainant and its licensees has been with the complete pavement covered by the three patents in suit (x-Q. 78, page 96).

As the defendants in this case have infringed all three of the Hassam patents, and have laid the complete Hassam pave-

ment, it is not necessary to discuss further the distinctions between the three patents.

As shown by the testimony, the Hassam pavement is an unqualified success. Road-building has been a problem which has engaged the attention of the best engineers in various communities for centuries. Road-building to-day is a live question in any community. The price paid for the Hassam pavement has varied from $1.45 to $4.10 per yard, due to various conditions (Hassam, A. 10, page 85). The price paid to these defendants by the City of Portland for Hassam pavement was $1.75 per square yard (page 29). This figure was offered by these defendants without including any royalty.

When Mr. Hassam testified in June, 1912, complainants had worked about five years introducing Hassam pavement, the first patent being dated April 23, 1907. Three million yards had been laid. Taking $2.00 as a fair average price of the pavement, this represents a business of over six million dollars.

Hassam pavement must have successfully fulfilled every requirement, because municipalities throughout the United States would not have invested these millions of dollars in Hassam pavement otherwise. While the Hassam methods may seem simple, and, in the light of to-day's experience, it may be a matter of wonder that the methods were not before devised, yet the fact remains, with the building of pavements a burning question throughout the breadth of this land for many years, that no engineer, no road builder, no concrete contractor, nor any man who had his attention directed to the inefficiency and poor quality of pavement, when it was attempted to use cement concrete prior to Mr. Hassam's inventions, ever saw how to remedy the defects and make successful cement concrete pavement. In the Law of Patents it is the last step, like Mr. Hassam's, which turned failure into success and which brought about great commercial use, which is rewarded by the Patent Law.

Law on Simple Meritorious Inventions.

Barb Wire Patent, 143 U. S., 275–282 :

> " Under such circumstances courts have not been reluctant to sustain a patent to the man who has taken the final step which has turned a failure into a success. In the law of patents it is the last step that wins. It may be strange that, considering the important results obtained by Kelly in his patent, it did not occur to him to substitute a coiled wire in the place of the diamond shape prong, but evidently it did not; and to the man to whom it did ought not to be denied the quality of inventor. There are many instances in the reported decisions of this court where a monopoly has been sustained in favor of the last of a series of inventors, all of whom were groping to attain a certain result, which only the last one of the number seemed able to grasp."

Krementz vs. Cottle, 148 U. S., 556–559 :

> " It is not easy to draw a line that separates the ordinary skill of a mechanic, versed in his art, from the exercise of patentable invention, and the difficulty is specially great in the mechanic arts, where the successive steps in improvements are numerous, and where the changes and modifications are introduced by practical mechanics. In the present instance, however, we find a new and useful article, with obvious advantages over previous structures of the kind. A button formed from a single sheet of metal, free from sutures, of a convenient shape, and uniting strength with lightness, would seem to come fairly within the meaning of the patent laws."

Carnegie Steel Co., Ltd., vs. Cambria Iron Company, 185 U. S., 403.

> " It is true that the Jones patent is a simple one, and in the light of present experience it seems strange

that none of the expert steel makers, who approached so near the consummation of their desires, should have failed to take the final step which was needed to convert their experiments into an assured success. This, however, is but the common history of important inventions, the simplicity of which seems to the ordinary observer to preclude the possibility of their involving an exercise of the inventive faculty.

Diamond Rubber Co. vs. Consolidated Rubber Tire Co. and *Rubber Tire Wheel Co.*, 220 U. S., 428.

"The tire has utility, a utility that has secured an almost universal acceptance and employment of it, as will subsequently appear. It was certainly not an exact repetition of the prior art. It attained an end not attained by anything in the prior art, and has been accepted as the termination of the struggle for a completely successful tire. It possesses such amount of change from the prior art as to have received the approval of the Patent Office, and is entitled to the presumption of invention which attaches to a patent. Its simplicity should not ~~blind~~ blind us as to its character. Many things, and the patent law abounds in illustrations, seem obvious after they have been done, and, 'in the light of the accomplished result,' it is often a matter of wonder how they so long 'eluded the search of the discoverer and set at defiance the speculations of inventive genius' (Pearl v. Ocean Mills *et al.*; 2 Bann & A., 469; Fed. Cas., 10,876). Knowledge after the event is always easy, and problems once solved present no difficulties, indeed, may be represented as never having had any, and expert witnesses may be brought forward to show that the new thing which seemed to have eluded the search of the world was always ready at hand and easy to be seen by a merely skilful attention. But the law has other tests of the invention than subtle conjectures of what might have been seen and yet was not. It regards a change as evidence of novelty, the acceptance and utility of change as a further evidence, even as demonstration. And it recognizes degrees of

change, dividing inventions into primary and secondary, and as they are, one or the other, gives a proportionate dominion to its patent grant. In other words, the invention may be broadly new, subjecting all that comes after it to tribute, (Railway Co. vs. Sayles, C. D., 1879, 349 ; 15 O. G., 243 ; 97 U. S., 554) ; it may be the successor, in a sense, of all that went before, a step only in the march of improvement, and limited, therefore, to its precise form and elements, as the patent in suit is conceded to be. In its narrow and humble form it may not excite our wonder as may the broader or pretentious form, but it has as firm a right to protection. Nor does it detract from its merit that it is the result of experiment, and not the instant and perfect product of inventive power. A patentee may be baldly empirical, seeing nothing beyond his experiments and the result ; yet if he has added a new and valuable article to the world's utilities he is entitled to the rank and protection of an inventor."

George Frost Co. et al. vs. Cohn et al., 119 Fed., 505 (Circuit Court of Appeals for the Second Circuit) :

"That its selection was not an obvious thing is persuasively and cogently shown by the fact that during many years numerous inventors were trying to remedy the defects in the old device, and it did not occur to them how simply and satisfactorily this could be done by making the button of rubber or some other elastic or yielding material."

Regent Mfg. Co. et al. vs. Penn Electrical & Mfg. Co., 121 Fed., 80 (Circuit Court of Appeals for the Seventh Circuit).

"The device seems exceedingly simply. But its very simplicity, in such an old field, should be a warning against a too ready acceptance of the *ex post facto* wisdom of the bystander."

Farmers' Mfg. Co. vs. Spruks Mfg. Co., et. al., 127 Fed., 691 (Circuit Court of Appeals for the Fourth Circuit.)

> " Simple as the device is, others failed to see it, or to estimate its value, or to bring it to the public notice."
> * * * * * * *
> " It was this last step, which has turned previous failures into a success, and we are therefore of opinion that the East patent is valid."

H. J. Heinz Co. vs. Cohn, 207 Fed. Rep., 547–559. (Circuit Court of Appeals, Ninth Circuit.)

> " On the other hand, many instances may be found where very simple concepts have been declared to be the product of inventive genius. Two instances which are fair illustrations are referred to in Potts vs. Creager, *supra*. One was respecting the application to telegraph instruments of a torsional spring such as had been previously used in clocks, doors and other articles of domestic furniture (Western Electric Company v. La Rue, 139 U. S., 601, 11 Sup. Ct., 670, 35 L. Ed., 294), and the other the substitution of the use of anthracite coal for bituminous in smelting iron ore, inasmuch as it produced a better article of iron at less expense (Crane v. Price, Webster's Pat. Cas., 409). Thus it is that simplicity of device is not necessarily the test of lack of invention or patentability. When a thing has succeeded it often seems very plain and simple, and the wonder is that its suggestion had not come earlier; but the fact remains that no one has ever thought of it, whether skilled or not, and yet its utility is at once recognized when brought to public attention. This of itself is evidence of invention. As is said by Mr. Justice Bradley in Loom Co. v. Higgins, 105 U. S., 580, 591 (26 L. Ed., 1177):
>
> > " 'It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of known elements produce a new and beneficial result, never attained before, it is evidence of invention.' "

Patents on Pavements Sustained.

There has been considerable litigation in the United States on patents relating to pavements. Some patents have been sustained, and others invalidated, but the Courts have not been reluctant to sustain a patent on pavement, or a process of making same, when the improvement was novel and had gone into commercial use.

City of Elizabeth vs. The American Nicholson Pavement Co., 97 U. S., 126:

> " it is declared that the nature and object of the invention consists in providing a process or mode of constructing wooden block pavements upon a foundation along a street or roadway with facility, cheapness and accuracy, and also in the creation and construction of such a wooden pavement as shall be comparatively permanent and durable, by so uniting and combining all its parts, both superstructure and foundation, as to provide against the slipping of the horses' feet; against noise; against unequal wear; and against rot and consequent sinking away from below."
>
> * * * * * * *
>
> " None of these pavements combine all the elements of Nicholson's, much less a combination of those elements arranged and disposed according to his plan. We think they present no ground for invalidating his patent, and no defense to this suit."

Hurlburt vs. Schillinger, 130 U. S., 456, approving a number of opinions, including Judge SAWYER's opinion in the District of California, 8 Fed. Rep., 821:

> " The invention of Schillinger was a very valuable one. The evidence is that it entirely superseded the prior patent of laying concrete pavements in a continuous, adhering mass."

Warren Bros. Co. vs. City of Owosso, 166 Fed. Rep., 309–313 (Circuit Court of Appeals, Sixth Circuit):

> " The fundamental idea of Warren is not that the ' density ' of his composition gives the stability which he claims, but that the mineral aggregate should of itself resist displacement by traffic. Neither is the utility or intrinsic value of the Warren pavement seriously denied, though its superiority over the sheet asphalt, under ordinary conditions, is by no means conceded. Aside from any sort of concession as to the utility and intrinsic value of the structure of the patent, its durability and practical value in use is established by a great volume of evidence coming from expert engineers acquainted with the pavement problem, as well from others who speak from observation, of the pavement in use in many parts of the country. Its durability under traffic, its cleanliness, its noiselessness, and freedom from undue slipperiness as compared to most other forms of pavement structure may be regarded as well established."

The Schillinger patent involved in the Supreme Court case, 130 U. S., contained claims drawn directly on the pavement itself. The claims involved in the Warren patent in the case decided by the Circuit Court of Appeals for the Sixth Circuit (the opinion being written by Judge LURTON, now Mr. Justice LURTON) were of a similar character, that is, they were drawn directly upon the pavement itself. Claim one of the first Hassam patent and claims one, two and three of the second Hassam patent are of this character.

The patent to Nicholson, involved in the Supreme Court case in 97 U. S., contained two claims. The first was a process claim on the way a pavement was made, and the second was a claim directly upon the pavement itself. The process claim was substantially of the same character as claim one of the first Hassam patent and claim 4 of the third Hassam patent.

Therefore, it is settled law that a claim to a pavement *per se*, and also a claim to a process of making the pavement can form proper subject matter for patent. The claims of the Hassam patent here in suit are therefore not open to criticism as not covering proper subject matter under the law.

Infringement.

The defendants laid their pavement in accordance with the specifications which had been worked up, from time to time by complainants, to practice and embody the inventions of the Hassam patents. The defendants only question their infringement of the second patent. Defendants' argument in this respect is a mere quibble.

Whether the first and third patents are construed broadly or narrowly ; whether the Court regards the same as covering a pioneer invention or only an improvement upon existing pavements and methods of making the same, the defendants have paid the complainants the compliment of piracy in the baldest sense of the term.

Mr. Johnson, the president of the defendant, Consolidated Contract Company, pays an unwitting tribute to the value of Mr. Hassam's pavement foundation made by first crushing the layer of broken stone and then grouting with cement mixture to fill the small voids, in his answer on page 185.

> "Yes, and there is only one way we can cause the voids to be filled up, and *that is by pouring in the thin cement which runs in all these voids, and it certainly fills them all up, and is the only way that could be done satisfactority that I know of now.* We pour that material over the top until it stands on top of the street. If it does not fill as it goes down it fills as it comes up. We put that thin grout on until it stands on top of the finished street."

With relation to the second patent, the particular feature thereof over the first patent, as previously pointed out, consists in the step—"agitating the mass to expel the air and filling the voids between the stone with said grout." This is done, as stated in the patent, by rolling the crushed stone during the grouting process, so that the trapped air will be liberated and the cement grout will flush up to the surface, whereby all the voids or spaces between the stone will be filled with the grout. This step is performed as follows:

> "To properly agitate the grout, I preferably employ a steam roller which may be the same used for compressing the stone" (page 1, lines 48–50).

The defendants' argument of non-infringement of this claim is predicated upon the point that they first crush the uncoated, broken stone with a *ten-ton* roller, and then pass a *five-ton* roller over the crushed stone during the process of grouting with cement to liberate the trapped air.

The specifications under which the defendants work and which are the Hassam specifications, contain the following:

> "The voids in the rock shall then be thoroughly filled with a grout consisting of one part of Portland cement to two parts of sand. This grout shall be sufficiently thin to flow freely, and shall be thoroughly and continuously mixed and poured upon the rock until all the voids are filled and the grout flushes to the surface under the rolling or compression, which shall immediately follow the grouting and shall be continued until no further compacting results." (Page 20).

For what possible purpose do the defendants use this five-ton roller during the cement grouting operation unless it be for the purpose of claim two of the patent? A piece of rock can be broken with a ten-ton hammer, and certainly can be agitated with a five-pound hammer thereafter. Defendants' con-

tention that they do not infringe this claim is completely disposed of by complainants' rebuttal proofs.

(Prof. French, pages 246, 247):

> " x-Q. 12. From your experience, observation and reading upon the subject of concrete, would you say that after a roadbed of broken rock had been rolled with, say a ten-ton roller, until the voids were reduced to a minimum, that after the application of a grout until the same flushed to the surface, that the rolling after that of the mass would be of any benefit?
>
> " A. I should say that it would.
>
> " x-Q. 13. Why?
>
> " A. The rolling of the broken stone with the ten-ton roller consolidates the stone, decreases the voids, and makes difficult the entrance of the grout. Unrolled stone would present freer passages for the grout.
>
> " x-Q. 14. But if the ten-ton roller has so compressed the mass that there can be no further reduction of the voids, what effect upon the rock would the second rolling have?
>
> " A. The second rolling, while it would not further reduce the voids, *does shake or agitate the broken stone sufficiently to be of material aid in the grout entering the voids of the stone.*"

This testimony was brought out on cross-examination by *defendants'* counsel.

Mr. Hassam's testimony, page 248:

> " Q. 2. Assuming that in the method of making the so-called Hassam pavement that a ten-ton roller was used in the initial step of crushing or solidifying the naked, uncoated broken stone, and that thereafter, and after the step of grouting a five-ton roller was rolled over the grouted, crushed broken stone, while the grout was still fluid, what effect would the five-ton roller have?
>
> " A. The five-ton roller would agitate the mass, permeate the grout into the stones and make a solid

monolith. I have noticed that after rolling the dry, crushed stone with an eight-ton roller before the grouting and then using an eight-ton roller after the grouting, that the front roll on the eight-ton roller would agitate the mass to a considerable extent. This front roller of an eight-ton roller has less pressure to the square inch than the rear roller of a five-ton roller. This is due to the fact that in the case of an eight-ton roller and a five-ton roller that three-fifths of the total weight is on the rear roll, and the width of a five-ton roller is 42 inches, an eight-ton roller is 53 inches wide. Therefore, with an eight-ton roller, the compression of the front roll is 136 lbs. to the sq. inch, and with a five-ton roller the compression is 157 lbs. to the sq. inch with its rear roll. It has been my experience after a great deal of study and practical experience that a Hassam pavement of dry stone, after being grouted, agitates very easily, even with heavy tampers, after it had been rolled."

From all viewpoints, defendants have infringed the three Hassam patents in suit. They themselves have contributed nothing to improve pavement building, but are merely leeches on the industry.

Defendants' Infringement—An Argument in Favor of the Validity of Patents.

The Courts have often held where a defendant, with all the processes of the prior art open to him, deliberately pirates and infringes a patent regularly granted, and attempts to justify such piracy by an attack on the validity of the patent, that such conduct in itself constitutes a strong argument toward the validity and meritoriousness of the patent.

A. R. Milner Seating Co. vs. Yesbera, 133 Fed., 916-919 (Circuit Court of Appeals, Sixth Circuit) :

> "The proof also shows that the Milner counter seat has met with considerable public favor, and, what

> is persuasive evidence of its advantages over those of the constructions the defendant advances as anticipations, the latter appropriates Milner's production as the foundation of his own business, and has therewith been very successful (Lehnbeuter v. Holthaus, 105 U. S., 94, 96, 26 L. Ed., 939; Gandy v. Belting Co., 143 U. S., 587, 595, 12 Sup. Ct., 598, 36 L. Ed., 272; Lamb Knit Goods Co. v. Lamb Glove & Mitten Co., 120 Fed., 267, 56 C. C. A., 547)."

Draper Co. vs. American Loom Co., 161 Fed., 728–730 (Circuit Court of Appeals, First Circuit):

> "Moreover, in the case at bar, we have not only the persistency of the respondent corporation in availing itself of the complainant's improvement, but also a mass of alleged anticipatory patents introduced by it, both of which indicate the desirability of something better than the prior art. On the whole, while the invention is a narrow one, and in the absence of the circumstances to which we have referred, might lack patentability, we are compelled to give the complainant the benefit which the issuing of its patent implies."
>
> *Heinz Co. vs. Cohn*, 207 Fed. Rep., 560, C. C. A., 9th Circuit; quoted *ante*, page 39 of this brief.

The Defenses.

Coming now to consider the prior art, upon which the defendants ask the Court to strike down and confiscate the meritorious patents here in controversy, it is hardly necessary to say that the defendants have the burden of proof upon them. In every art can be found prior patents which represent failures, and prior publications which contain general descriptions, the wording of which a defendant can twist to suit the purpose of such defense.

A patent is a substantial right and the foundation to destroy it must be in its way no less substantial. A prior patent or

publication in order to form an anticipation must contain a full and clear disclosure, which will enable the exact invention of the patent in suit to be practiced without using the patent in suit as a necessary side light.

The evidence of the defendants may be divided into—

1. Prior patents;

2. Prior publications;

3. Parol testimony concerning certain alleged prior uses; and

4. McClintock's abandoned experiment.

They will be considered in this order.

The Prior Patents.

1. The prior patents are four in number.

The processes and pavements described in these four prior patents are carefully considered by complainants' expert, Arthur S. Browne, pages 220–226 of the record. Mr. Browne's discussion of these patents is so eminently fair that on cross-examination he was not asked any question concerning the subject matter.

The only patent which seems worth considering in connection with Mr. Hassam's invention is the patent to Murphy, No. 238,706, which appears on pages 330, 331 of the record. In this patent a three-part pavement is formed having a broken stone and iron slag grout foundation B, a layer C of slag and lime thereon, stone blocks A placed on the layer C, and an intersticial filling of grout between the stone blocks A. The pavement is clearly defined in the claim which is as follows:

> "The improved pavement, formed of the broken stone and grout foundation B, the layer C, of slag and lime, the stone blocks A, and the intersticial filling of grout, all as shown and described."

It was claimed that the foundation in this three-part pavement has some analogy to the cement concrete foundation of the first Hassam patent in suit. This patent certainly has no relevancy or bearing upon the complete Hassam pavement.

The foundation for the Murphy pavement is made as follows : The road bed is first prepared, then

> " Upon such bed I spread a layer of broken stone or slag B, to the depth of about six (6) inches, *which is grouted and then rolled* with a heavy roller, to form a firm and solid foundation " (Lines 26–30).
>
> * * * * * *
>
> " The grout I employ is made of the following ingredients in or about the proportions stated : Lime, ground or slaked (blue lias preferred), twenty per centum ; sand, clean and pure, thirty per centum ; iron slag or furnace cinders, twenty-five per centum ; Portland cement, ten per centum ; silica, or oxide of iron, ten per centum ; cast-iron filings, sulphur, etc., five per centum " (Lines 56–64).

While this patent does show the desirability of using grouted concrete as a foundation for a pavement, the steps and the grout suggested are utterly impracticable to make a stable concrete. After the broken stone or slag is laid, it *is first grouted* with a peculiar grout specified. There is no rolling or compressing of the uncoated stone before the grouting. One of the essential steps of the process of the first Hassam patent is the rolling or compressing the stone in an *uncoated or naked* condition *before* grouting. Mr. Hassam says in his first patent :

> " Broken stone or gravel is then spread to a proper depth and rolled with a steam-roller or compressed by any suitable means until the voids between the stone are small and the surface even. *It will be noted that as there is no coating of cement, bituminous, or other mate-*

rial on the pieces of stone they can be compressed very close together and solid, and the voids left between them will be extremely small. *When the stone* or gravel *has been compressed* to the desired closeness and firmness, *it is grouted* with a mixture of cement, sand, and water" (page 1, lines 61–73).

The claim of the first Hassam patent calls for " a bottom layer of *hard rolled uncoated stone*."

In other words, the steps proposed by Murphy are just opposite to Hassam. Hassam rolls his foundation of uncoated stone so that the voids are reduced to a minimum before the cement grout is applied, thus getting as much stone as is possible into the structure and economizing in grout ; whereas, Murphy proposes to apply grout to the foundation before rolling takes place.

The testimony shows that it is impossible to carry out the practice described in the patent to Murphy ; that is, of laying the stone, grouting it, and then rolling it. In the old method of making a concrete foundation of first coating the broken stone with cement and then laying it on the road, a roller was never employed and never could be employed owing to the slippery, unstable condition of the mass (See Prof. French's A. x-Q. 15, page 247). The same would be true of Murphy's purposed method of rolling uncrushed, grouted stone.

Mr. Hassam's process of rolling and compressing the stone in a naked or uncoated condition and then grouting it with cement, sand and water provides a stable mass over which a steam roller can be easily pressed to agitate the mass to allow a thorough grouting, as covered by the second Hassam patent.

The proposed Murphy process of grouting the stone as the first step after it is laid and before it is rolled is an utterly impractical and inoperative idea.

Moreover, the grout proposed by Murphy, containing

twenty-five per centum of iron slag or furnace cinders is not a grout which could be worked into crushed broken stone. The grout would not "fill all the voids therein," as specified in claim one of the Hassam patent.

At any rate, the pavement foundation of this Murphy patent is not the Hassam pavement foundation and is not the pavement foundation laid by the defendants in constructing Hassam pavement.

Mr. Browne's summary concerning this prior patent cannot be traversed.

> "Obviously, this Murphy pavement and the method of making it bear no resemblance to the Hassam pavement and method.
>
> "In Murphy, there is no preliminary hard rolling of the stone foundation before the grouting is applied; there is no grouting whose ingredients are simply cement and sand; there is no agitation or disturbance of the previously hard-rolled stone foundation to insure the grouting flowing into all of the voids and expelling the air; and there is no continuous grouting occupying the voids between the foundation stones and serving to bind the surface layer of small stones to the foundation" (Record, page 222).

The defendants have not attempted to show that a single yard of pavement ever was laid under this patent to Murphy. Complainants made a careful investigation but could find no trace of Murphy, nor any trace of anything done by him. The patent to Murphy is a mere prior paper patent representing an impracticable idea.

While, of course, a patent granted prior to the patent in suit is part of the prior art, and the patent in suit must distinguish therefrom to be valid, the Courts have often said where the prior patent covers an impractical structure which never went into use, and where the patent in suit has proved to be of great utility and has gone into extensive use, that

the prior unsuccessful patent is not to be enlarged or built upon, or ambiguous language therein contained revamped to destroy the patent which has advanced the art.

Robins Conveying Belt Co. vs. American Road Mach. Co., 145 Fed., 923, 924 (Circuit Court of Appeals, Third Circuit).

> " The Healey device was to some extent a paper patent, since it never came into general or extensive use. It had obvious disadvantages.
>
> * * * * * * *
>
> " The Healey patent, although issued about 18 years prior to the patent in suit, never seems to have suggested to any one a construction like that of the Robins patent, which was designed to, and does substantially, obviate all of the disadvantages just adverted to in the use of the Healey patent."
>
> * * * * * * *
>
> " The device in suit was a success from its inception, it came at once into general use, and we are satisfied is of manifest novelty and great utility. The testimony shows that it practically doubles the life of the belt, because of the reduced friction and the regular and constant support which it receives. This consideration, coupled with its undoubted commercial success from the outset, would be entitled to turn the scales in favor of the validity of the patent, if it were otherwise in doubt."

Hall Signal Co. et al. vs. General Ry. Signal Co., 169 Fed., 290–294 (Circuit Court of Appeals, Second Circuit) :

> Success cannot be anticipated by failure.
>
> * * * * * * *
>
> " If we may judge the prior systems from the fact that none of them, except in one or two tentative instances, went into actual use, the inference is plain that railroad men were unwilling to take the risk of installing them. When Wilson took up the work it had virtually been abandoned by the others, they had tried and failed and there was no reliable normal danger

plan then in existence. That Wilson solved the problem we have no doubt, the systems installed under his patent are successful and are rapidly growing in popularity. We do not consider him a pioneer in the sense that he discovered a new art. The idea of a normal danger system was old but he was the first to harness it and set it to work. So much he has contributed and to this extent he is entitled to protection."

American Graphophone Co. vs. Leeds & Catlin Co. et al., 170 Fed., 327-330 (Circuit Court of Appeals, Second Circuit):

"A valid patent should not be destroyed by a vague, confused, indeterminate document.

"If to-day a skilled artisan, who had never heard of the Jones or Adams-Randall patents, were given a Jones disk and the Adams-Randall patents and directed after reading the patent, to construct similar disks, we doubt whether, even with such information, he would be able to do so. It must be remembered that the English patent was granted in 1888, nine years before the Jones application, and in the interval, Bell, Tainter, Berliner, Edison and many other accomplished inventors were striving to produce commercial record-disks, but it never occurred to any of them, not even to Adams-Randall himself, to follow what is now said to be the obvious direction of the Adams-Randall patent.

"Is not the fact that the patent was never heard of until it was resurrected for the purpose of this litigation, persuasive evidence that it contained nothing of value to the art?"

* * * * * * *

"In short, we are unable to see that Adam's-Randall's contribution to the art advanced it a single step. His patents abound in tentative, indeterminate, and infeasible suggestions too nebulous to anticipate a patent which has actually shown the art how to make the thing needed. In contemplation of the law an invention does not exist until the inventor's ideas have been reduced to practical form. As was said in Stand-

ard Cartridge Co. v. Peters Co., 77 Fed., 630, 645, 23 C. C. A., 367, 381:

> " 'The mere existence of an intellectual notion that a certain thing could be done, and, if done, might be a practical utility, does not furnish a basis for a patent, or estop others from developing practically the same idea.'
>
> " The burden of proving anticipation by clear and convincing evidence rests heavily upon the defendants. We cannot avoid the conclusion that the sanguine and optimistic view taken by the defendants of the Adams-Randall patents is not justified by anything found in the patents themselves. The patent upon which the chief reliance is placed fails to give a clear statement of the method of producing the Jones disk. The naked assertion that a certain result has been accomplished without stating how, without describing the means which produce the result is insufficient as an anticipation (Hanifen v. Godshalk Co. 84 Fed., 649, 28 C. C. A., 507).
>
> " The most favorable view for the defendants is that the question of anticipation by the Adams-Randall patents is involved in doubt, and this is fatal to their contention. 'If the process pursued for its development failed to reach the point of consummation, it cannot avail to defeat a patent founded upon a discovery or invention which was completed. * * * The law requires not conjecture but certainty.' Coffin v. Ogden, 18 Wall., 120–124, 21 L. Ed., 821; Badische v. Kalle, 104 Fed., 802, 44 C. C. A., 201."

Judge Bean's reasons for refusing to stretch this patent to anticipate the Hassam patents in suit are absolutely conclusive.

> " In the Murphy patent there is no provision for rolling the stone foundation before the grouting is applied, no grouting consisting simply of cement, sand, and water, no agitation or disturbance of a previously rolled stone foundation to cause the grouting to fill out the voids and expel the air, and no continuous grouting occupying the voids between the foundation stone and

> serving to bind the surface layer of small stones to the foundation. Moreover, although the Murphy patent was issued in 1881, there is no evidence that any pavement was ever laid under it. It never came into general or extensive use. It is a mere paper patent and should not be held to invalidate the complainants' patent, which the evidence shows to be in common and extensive use."

The other three prior patents need not be considered specifically in this brief. They are fully discussed by Mr. Browne (Pages 222-226).

The patent to Bayard, No. 381,667, and the patent to Hagerty, No. 413,278, are paper patents. The patent to Warren, No. 675,430 is one of the patents taken out on the so-called bitulithic pavement.

All of these three prior patents relate to roads or pavements made out of bituminous compounds, such as asphalt and tar. The roads or pavements made by the process disclosed in these patents have to be laid hot. There is nothing relating to concrete roads having *a grouting of cement*, as specified in claim one of the first Hassam patent; *grouting with a mixture of cement, sand and water*, as specified in the claim in suit of the second Hassam patent; or *the grouting of cement* or *cement grouting*, as specified in the third patent.

These three prior patents under discussion properly come under the head of bituminous pavements, which will be considered at a later point in this brief. A bituminous or asphalt pavement has no bearing upon the patents in suit. The prior art as represented by these four prior patents does not negative the validity of any one of the claims of the Hassam patents.

The Prior Publications.

The prior publications are treated by Complainants' expert, Mr. Browne, pages 229–235 of the record. The only statement in the publications which seems at all material, or which has any bearing upon a concrete foundation made of crushed broken stone and a cement grouting, is found in the Encyclopedia Britannica and is contained in the first paragraph printed on page 161 of the record, and is as follows:

> "Concrete macadam, formed by grouting with lime or cement mortar a coat of broken stone laid over a bed of stone previously well rolled, has been tried as an improvement on an ordinary macadamized surface, but not hitherto with much success."

So far as can be gathered, this unsuccessful idea relates entirely to the making of *the surface* of the pavement. In short, this idea comprises, in the first place, a foundation bed of stone well rolled. Whether the stone is to be large or small, coated or uncoated, is guess-work. Then a coat of broken stone is laid on said foundation bed *without rolling.* Then this unrolled layer of broken stone is grouted with lime or cement mortar. It is apparent that the grouting is not applied or intended to be applied to the foundation. The grouting is simply used with the superimposed top coat of unrolled broken stone. There is no description of how the grouting and broken stone are incorporated together. There is no suggestion in this paragraph that the foundation is to be made into a solid structure.

So far as can be gathered from the general statements in this paragraph, there is nothing at all suggested which has any bearing upon the Hassam processes and the Hassam pavement. The statement simply shows how, previously to Has-

sam, the use of cement concrete in any way in pavements *had been unsuccessful.*

It is not necessary to detail all the publications at length. This has been fully done by Mr. Browne in his testimony. No one of the publications measures up to the requirements of law to form an anticipation. The law is well established with regard to the character of a publication necessary to constitute an anticipation.

Seymour vs. Osborne, 11 Wall., 555.

> " Patented inventions cannot be superseded by the mere introduction of a foreign publication of the kind, though of prior date, unless the description and drawings contain and exhibit a substantial representation of the patented improvement, in such full, clear and exact terms as to enable any person skilled in the art or science to which it appertains to make, construct and practice the invention to the same practical extent as they would be enabled to do if the information was derived from a prior patent. Mere vague and general representations will not support such defense, as the knowledge supposed to be derived from the publication must be sufficient to enable those skilled in the art or science to understand the nature and operation of the invention, and to carry it into practical use. Whatever may be the particular circumstances under which the publication takes place, the account published, to be of any effect to support such a defense, must be an account of a complete and operative invention capable of being put into practical operation (Web. Patent Case, 719; Curt. Pat. (3d ed.), sec. 278*a*; Hill v. Evans, 6 Law T., N. S., 90; Betts v. Menzies, 4 Best & S., Q. B., 999)."

Cohn vs. U. S. Corset Co., 93 U. S., 366–370:

> " It must be admitted that, unless the earlier printed and published description itself exhibits the later patented invention in such a full and intelligible manner as to enable persons skilled in the art to which the inven-

tion is related to comprehend it without assistance from the patent, or to make it, or repeat the process explained, it is insufficient to invalidate the patent."

Carnegie Steel Co. vs. Cambria Iron Co., 185 U. S., 403:

> " Certain discussions, reported in the Journal of the British Iron and Steel Institute, are relied upon as embodying a description of the Jones process. Running through all these discussions there is the same idea of the difficulties experienced in the practical carrying out of the direct process by reason of the want of uniformity in the different products of the blast furnaces, and the possibility of remedying this and thereby doing away with the expense of remelting the pig iron in cupolas by a mixture of such products in a reservoir intermediate the furnaces and the converters; but the dominant idea of the Jones patent, of maintaining a permanent and large quantity of molten metal in the mixer for that purpose, does not seem to have occurred to any of the writers upon the subject. Through all these papers there is an admission of practical failure in the efforts theretofore made to obviate the difficulty, and a half-expressed hope that American ingenuity might ultimately solve the problem. Some of the expressions, taken by themselves, seem to foreshadow the Jones idea; but there was nothing in any of these discussions that filled the requirement of the law (Rev. Stat., § 4886) of a description in a publication sufficient to anticipate the patent."

The Alleged Prior Uses.

The only definite testimony directed to the prior use or construction of a cement concrete pavement foundation is found in the deposition of George W. Gordon (pp. 139–143 and 199–205) and in the stipulated deposition of A. C. Gilman (pp. 350–365).

The witness Gordon is a carpenter, sixty-three years of age Mr. Gordon was born in Liverpool, England,

and left there when he was twenty-four or twenty-five years of age, thirty-eight or thirty-nine years before he testified. This witness is opposed to Hassam pavement and his bias and interest are apparent. His testimony is directed to a description of the way he thought some pavement was laid in the streets of Liverpool before he left, and also has reference to some concrete pavement about the docks in Liverpool which was laid before he appeared on the scene, and concerning which he testifies how he was told it was made. So far as can be gathered from the statements of this witness, the cement concrete laid in these places was laid by the old process, that is, by first coating the stone with cement at the side of the road and then laying the coated stone on the road. It is hardly believed that this testimony will be seriously urged.

Under the Statutes, prior use of an invention in a *foreign* country does not affect or have any bearing on the validity of a United States letters patent.

> *Section 4923.*
>
> " Whenever it appears that a patentee, at the time of making his application for the patent, believed himself to be the original and first inventor or discoverer of the thing patented, the same shall not be held to be void on account of the invention or discovery, or any part thereof, having been known or used in a foreign country, before his invention or discovery thereof, if it had not been patented or described in a printed publication."

Neither does knowledge by a man residing in this country, of a prior use of an invention in a foreign country, have any bearing on the validity of a United States letters-patent.

Westinghouse Machine Co. vs. General Electric Co., 207 Fed., 78 (Circuit Court of Appeals, Second Circuit).

> " Section 4923 deals specifically with the effect of knowledge and use in a foreign country, and it makes

> no distinction whether such use is made or such knowledge is acquired by persons who, after using the thing or acquiring the knowledge, remain abroad or come here. This section (4923) provides that the patent taken out by an applicant for the same thing here shall not be void on account of such knowledge or use unless the invention had been patented or described in a printed publication. As we construe this section, reduction to practice in a foreign country can never operate to destroy a patent applied for here, however widely known such reduction practice may be, either among foreigners or among persons living here, unless the invention be patented or described in a printed publication. To that extent section 4923 qualifies the language of section 4886, which without such qualification might well lead to a different result."

Mr. Gordon was recalled to the stand and testified that about thirty-two years ago he laid a basement floor in Detroit, Michigan, by spreading broken stone and brick on the basement floor and pouring a cement grout thereon to make up a concrete (page 199). This evidence is just as incompetent, as it merely is the unsupported oral testimony of one witness, and what if Mr. Gordon did make a floor in this manner, what has that got to do with a pavement? What has it got to do with Mr. Hassam's broad idea of laying uncoated, broken stone on a roadbed, crushing it with a roller to reduce voids, and then grouting with a cement grout?

Complainants brought another suit in Portland, Oregon for infringement of the Hassam patents, against the Reliance Construction Company, and it was stipulated that whatever decree was entered in the case at bar, should also be entered in this last case. The same counsel appear in both cases.

After the proofs in the case at bar were long closed, defendants' counsel brought forward a witness, A. C. Gilman and took his deposition in the case against the Reliance Construction Company.

By stipulation of the parties,this deposition has been printed

in this case, pages 350-365, so that all testimony concerning the attack on the validity of the Hassam patents in suit can be before this Court.

This witness is what is known as a " floater," that is he states, " at present I am unoccupied." When he testified he was staying at the Chesterbury Hotel, Portland. He has been engaged in lumbering, mining, farming and railroad work. So far as the material part of his testimony is concerned, it sums up about as follows :

When he was fourteen years old, that is in 1874, thirty-nine years before he testified, he says he saw a Russian named Waryzenak, lay an approach to a blacksmith shop twenty feet wide, probably about twenty feet square. He described the method of making this approach as follows (pages 352, 353) :

> " A. They excavated about eight inches deep to receive the pavement, then pounded up native stone there into suitable sizes and filled the excavation with loose rock, and then tamped it with a tamp bar or a block of wood, and then made the mixture of cement and sand and poured it over this stone and then swept it in and mixed it in a liquid form ; that is quite a thin solution."

This witness testifies that he has had no experience himself in the paving business.

This witness says he saw this approach ten years afterward, but that the building has since burned down and another building has been erected on the ground, so that the approach is no longer in existence. It is, therefore, impossible to verify or disprove what this witness says he saw.

But attempting an analysis of this witness' testimony, tamping stone with a " tamp bar or block of wood " would not compress or crush the stone together to any appreciable degree to reduce the voids. Tamping a layer of stone with a wooden block would not crush the broken stone so that the voids therein would be reduced to any appreciable degree, or

so that there would be produced what Mr. Hassam calls a bottom layer of *hard rolled*, uncoated stone. Further, there is nothing found in this witness' testimony to show that the structure described was used or constructed as a foundation to receive a suitable wearing surface to make up a pavement.

This witness further testifies that he has employed, himself, a process similar to the process employed by Mr. Hassam for making his pavement foundation, in making the floor for an engine house and for starting footings for foundation walls. The impossibility of hard-rolling an engine floor or the foundation footing of a building to get a layer of hard-rolled crushed stone, is apparent, and what have floors and foundation footings to do with pavement construction anyway?

The testimony of this witness is too conjectural to be of any value.

Moreover, the testimony on this prior use defense is entirely oral; it rests on the recollection of one man testifying to something he thought he saw thirty-nine years ago and no other witness or corroboration is brought forward.

The Courts have always refused to sustain a defense of prior use on testimony of this nature.

Washburn & Moen Mfg. Co. vs. Beat 'Em All Barbed Wire Co., 143 U. S., 275.

> " We have now to deal with certain unpatented devices, claimed to be complete anticipations of this patent, the existence and use of which are proven only by oral testimony. In view of the unsatisfactory character of such testimony, arising from the forgetfulness of witnesses, their liability to mistakes, their proneness to recollect things as the party calling them would have them recollect them, aside from the temptation to actual perjury, courts have not only imposed upon defendants the burden of proving such devices, but have required that the proof shall be clear, satisfactory, and *beyond a reasonable doubt.* Witnesses whose memories are prodded by the eagerness of interested parties

to elicit testimony favorable to themselves are not usually to be depended upon for accurate information. The very fact, which courts as well as the public have not failed to recognize, that almost every important patent, from the cotton gin of Whitney to the one under consideration, has been attacked by the testimony of witnesses who imagined they had made similar discoveries long before the patentee had claimed to have invented his device, has tended to throw a certain amount of discredit upon all that class of evidence, and to demand that it be subjected to the closest scrutiny. Indeed, the frequency with which testimony is tortured or fabricated outright, to build up the defense of a prior use of the thing patented, goes far to justify the popular impression that the inventor may be treated as the lawful prey of the infringer. The doctrine was laid down by this court in Coffin v. Ogden, 85 U. S., 18 Wall., 120, 124 (21, 821, 823), that 'the burden of proof rests upon him,' the defendant, 'and every reasonable doubt should be resolved against him.' "

National Hollow Brake-Beam Co. et al. vs. Interchangeable Brake-Beam Co. (106 Fed., 693–703). (Circuit Court of Appeals, Eighth Circuit.)

> " The solemn grants of great franchises cannot be stricken down by testimony so flimsy and unsatisfactory. The memory of men is too brief and fleeting, too easily swayed by chance and by interest, to permit the recollection of one or two witnesses, prompted by presently prepared pictures of the proof desired, to condition the validity of valuable patents that have stood unchallenged for years. Unsupported oral testimony of a prior use is always open to suspicion, and it cannot prevail over the legal presumption of validity which accompanies the patent, unless it is sufficient to establish such a use beyond a reasonable doubt. The testimony relative to the use of this Wabash beam is not of that character, and it will not be further considered."

It has not been shown in this case that a single piece of Hassam pavement was ever constructed before Mr. Hassam's

invention. If Mr. Hassam's invention had been merely the application of any of the ordinary or well understood methods of making concrete floors, or building foundations to the construction of a pavement, it is incomprehensible that the art of making concrete pavements should have remained a failure for so many years, with skilled engineers all over the country giving their attention to the problem of making the best pavements possible.

On this point the argument is exactly parallel with the reason Judge LURTON gave for rejecting a piece of sidewalk and masonry constructions as anticipations of the Warren patent on bitulithic pavement.

Warren Bros. Co. vs. City of Owosso, 166 Fed. Rep., 309–318.

> " We are the more indisposed to treat this piece of experimental sidewalk as an anticipation because, in the wide range which has been covered by the evidence in this case, it has not been shown that anywhere had there been constructed a *single rod of street pavement* according to his plan prior to his invention. Under such circumstances, we cannot think the proof of anticipation strong enough to deprive him of his invention."

Diamond Patent Co. vs. S. E. Carr Co., C. C. A. Ninth Circuit, October 13, 1914, 217 Fed. Rep., 400-402.

> " In Gaylor v. Wilder, 10 How. 477, 13 L. Ed. 504, it was held that the prior use must be so far understood and practiced or persisted in as to become an established fact, accessible to the public and contributing definitely to the sum of knowledge. Cases applying these rules are Acme Flexible Clasp Co. v. Cary Mfg. Co. (C. C.), 96 Fed., 344, Anthracite Separator Co. v. Pollock (C. C.), 175 Fed., 108, Ramsay v. Lynn (C. C.), 187 Fed., 218, and Ajax Metal Co. v. Brady Brass Co. (C. C.), 155 Fed., 409."

The testimony on this branch of the case merely shows the extremes to which the defendants are driven to find some excuse for the piracy of the patents in suit.

McClintock's Abandoned Experiment.

Mr. McClintock's experiment and its abandonment is clearly proven by the printed report read in evidence, page 198, and Mr. McClintock's deposition taken under commission, pages 207–214.

In 1893, Mr. McClintock was City Surveyor of Rochester, New York, and was familiar with the construction of pavements around stations and station yards. Owing to the unsatisfactory condition of the surface of the macadam roads in that vicinity, Mr. McClintock asked permission of the Board of Aldermen to try an experiment on South Fitzhugh Street. He was allowed to try this experiment and what he did is described in his printed publication. The same is also referred to in Table No. 5, showing miscellaneous improvements made during the Year 1893. This refers to the experiment as "*Resurfacing* with Macadam of trap rock and Portland cement grout," a little piece of road thirty-six feet wide and three hundred and twenty-five feet long between Main Street and the foot of approach to the Erie Canal bridge.

McClintock admits what he did "was in the nature of an experiment" and "had reference to the resurfacing of a small section of a street and not to the preparation of a foundation" and "the original foundation was left in the street." This foundation was "local stone laid in the form known as 'telford,' that is, it was flat stones set on edge and wedged together, as distinguished from macadam where the stones are broken into small fragments." This original foundation was "from one to two feet thick" and was not removed in applying the experimental surface. The experimental layer of trap rock was six inches thick in the middle of the street and two inches thick at the edges of the street. While this did produce a new top surface on the existing telford foundation, it was not a suitable top surface. It did not occur to Mr. McClintock or anyone else that a

beautiful foundation for a pavement could be produced by this process. The Hassam foundation is not adapted for the top surface or the wearing surface of a pavement and no claim has been made that it is.

The history of Mr. McClintock's experiment shows how near a man can come to making an invention and stumble over it and not bring it to the light of day.

Mr. McClintock says in his report (page 198) :

> " This has been down eight months and already shows that the size of stone used was too small ; it would all pass through a one and one-half inch ring. The stones are so small that the calk of a horseshoe throws out bodily a stone sometimes. I believe it will be well to try this again with stones which will pass a three-inch ring and will not pass a two-inch ring. The cost of this pavement was one dollar per square yard."

The experiment was never tried again, and the future history of this experiment puts it clearly into the category of an *abandoned* experiment, which is not sufficient in law to anticipate a successful patent.

Mr. McClintock's testimony on abandonment is as follows (Page 213) :

> " Cross-interrogatory seven : In this report, this statement is made, ' This has been down eight months and already shows that the size of the stone used was too small.' Please explain this more fully.
>
> " Answer : After eight months' use the horses' calks were picking out some of the individual stones and I became doubtful as to the advisability of going further with it until further experimenting or experience with it. Later temperature cracks developed.
>
> " Cross-interrogatory eight : What did the laying of the pavement referred to on page five of said report demonstrate to you ?
>
> " Answer : It demonstrated that I might have something of practical value, but that I had not carried it

far enough or experimented enough at length to demonstrate its practical value.

"Cross-interrogatory nine: Did you ever make any effort to introduce or try this pavement anywhere else except in 1893 on Fitzhugh Street in Rochester, New York?

"Answer: No."

This piece of surface was pulled up after it had been down four or five years (Page 211):

> "The piece of pavement laid, developed irregular temperature cracks and on one portion of it where the hacks stood in the shade of the court house, the horses would drill holes with their feet in kicking off flies, etc., so that it soon became a question of how the pavement could be maintained. It was some two and a half years after the pavement was laid, when I left the office of the City Engineer, as it had then become, and as I understand it, some two years after that, when an overhead bridge crossing the canal in the vicinity of such pavement was replaced by a lift bridge and the approaching grades were reduced, it was deemed wise by the city authorities then to cover the new portion of roadway with asphalt, and at that time *they also pulled out this short section of cement and substituted therefor asphalt.*"

Mr. McClintock never knew of any other pavement where such a cement concrete surface was tried (Page 210, A. 10 and 11).

This abandoned experiment clearly shows the difficulties experienced engineers encountered in trying to introduce cement concrete into the pavement construction, and clearly shows the obstacles Mr. Hassam had to overcome before he could reach success.

The McClintock experiment in itself has no bearing on Mr. Hassam's inventions. It did not relate to the preparation of a foundation for a pavement, as specified in the first Hassam

patent. The experiment has no bearing at all on the Hassam second and third patents.

Moreover, under the law of abandoned experiment Mr. McClintock's efforts are of no probative force to assist the defendants in their efforts to invalidate the Hassam patents in suit.

In *Tie Corn Planter Patent,* 23 Wallace, 181, 211, an alleged anticipatory machine was used for planting five acres of corn, "but the machine was never used again, and was afterwards broken up and no other was ever made." The Supreme Court held that there was no anticipation on the ground that the alleged prior invention was a mere abandoned experiment.

Smith vs. Goodyear Dental Vulcanite Co., 93 U. S., 486, 498.

> "The experiments resulted in nothing practical. * * * In consequence of these and other objections the manufacture was soon abandoned, and it may properly be considered an abandoned experiment."

Washburn & Moen Mfg. Co. vs. Beat 'Em All Barbed Wire Co., 143 U. S., 158–161.

> "It is possible that we are mistaken in this; that some one of these experimenters may have, in a crude way, hit upon the exact device patented by Glidden, although we are not satisfied from this testimony whether or by who it was done. It is quite evident, too, *that all or nearly all these experiments were subsequently abandoned.*"

Deering vs. Winona Harvest Works, 155 U. S., 286, 301.

> "if he ever used a pivoted device at all—of which we have considerable doubt—his efforts in that direction must be relegated to the class of *unsuccessful and abandoned experiments*, which, as we have repeatedly held, do not affect the validity of a subsequent patent."

Potts vs. Creager, 155 U. S., 597.

> "This device was constructed in 1874, was used for only half an hour when by an accident several of the scrapers or polishers were broken, and before others could be moulded the building took fire and burned down. That it was not considered a success is evident from the fact that the machine was never reconstructed, but in 1878 Creager took out a patent for a similar machine, in which a smooth or corrugated roller of wood, glass, bone, ivory, or metal was the distinctive feature. In short, the machine of 1874 appears to have been merely an abandoned experiment."

Gamewell Fire-Alarm Telegraph Co. vs. Municipal Signal Co., 61 Fed., 948, 952 (Circuit Court of Appeals, First Circuit).

> " The only use ever made of it by Wood was *merely experimental. It was never used for any practical purpose.* There is no pretence that Noyes ever knew of its existence."

Warren Bros. Co. vs. City of Owosso, 166 Fed. 309, 317 (Circuit Court of Appeals, Sixth Circuit).

> " The results from the experiment were not deemed important enough to induce the construction of other side-walks nor the material tried for street pavement purposes, for it should not be altogether ignored that, though the analogy between street pavement and side-walk pavement is close, there are material differences between the two problems. In one, the wear and strain to which it is subjected is that of the passage of pedestrians. In the other, the influences which tend to disintegration are those resulting from the steel-shod feet of horses and the grinding pressure of vehicular traffic. The failure in any way to prosecute the experiment under the circumstances is conduct from which abandonment may be imputed."
>
> "In Potts v. Creager, 155 U. S., 597, 604, 15 Sup. Ct., 194; 39 L. Ed., 275, an alleged prior use was not

considered a success, ' from the fact that the machine was never reconstructed.' The effect of conduct as evidence of abandonment is also referred to in Gayler v. Wilder, and other cases cited heretofore, as well as in the case of the Corn Planter Patent, 23 Wall., 181; 23 L. Ed., 161; and in Deering v. Winona Harvester Works, 155 U. S., 286, 301; 15 Sup. Ct., 118; 39 L. Ed., 153."

Kings County Raisin & Fruit Co. vs. U. S. Consol. Seeded Raisin Co., 182 Fed., 59-63 (Circuit Court of Appeals, Ninth Circuit).

"It is probably unnecessary, on this appeal, to determine just what effect should be given to the Crosby patent as limiting the scope of the Pettit invention. It would seem that it was one of those unsuccessful and abandoned inventions which are held to have no place in the art to which they relate. In an analogous case, Mr. Justice BROWN said:

"' His efforts in that direction must be relegated to the class of unsuccessful and abandoned experiments, which, as we have repeatedly held, do not affect the validity of a subsequent patent' Deering v. Winona Harvester Works, 155 U. S., 286, 302; 15 Sup. Ct., 118, 124; 39 L. Ed., 153."

Bituminous Pavements.

In the record there are many references to bituminous, asphalt and tar pavements. These have no bearing upon the cement concrete pavements involved in this suit, in which the solidification is obtained by the chemical setting, or hydration of cement. As previously pointed out, a bituminous pavement, generically speaking, is characterized by having bituminous, asphalt or tar compound embodied therein. These compounds have to be melted and worked hot to be embodied into the pavement. The making of a bitumiuous pavement by

melting such compounds and working them into pavements while hot is altogether a different process from Mr. Hassam's grouting simply with sand, cement and water. The Hassam method requires no special apparatus, the grouting being accomplished simply by pouring the creamy cement grout upon the layer of crushed, broken stone, and the result obtained is practically a monolith or a solid piece of stone, as distinguished from a bituminous pavement in which the materials are practically soldered together and held together by temperature. It is, of course, well known that a bituminous pavement melts, runs, or even disintegrates in hot weather.

The Hassam patents were granted by the Patent Office as relating to improvements in cement concrete pavements. The patents were carefully distinguished from bituminous pavements.

Successful bituminous pavements have been laid and are in use. It is not the purpose of this brief to decry the same. By reason of the high cost of bitumen, asphalt, or tar, by reason of the expensive processes necessary to work such ingredients hot, bituminous pavements usually cost several times more than the Hassam pavement. The Hassam pavement has gone into extensive use in direct competition with these bituminous pavements and has been adopted by reason of its great strength and low cost. It is obvious that the Hassam foundation is practically an imperishable piece of stone, while of course pavements made of bituminous compounds disintegrate after a time.

Now, turning to the way bituminous pavements are made, the same are described in the Encyclopedia Britannica as follows (Page 161) :

> " A foundation of bituminous concrete is sometimes used where only a thin bed can be laid, in consequence of there being an old foundation which it is undesirable to disturb. It is made by pouring a composition of coal-tar, pitch, and creosote oil while hot over broken

stone levelled and rolled to the proper form, and then spreading a thin layer of smaller broken stone over the surface and rolling it in."

The following is contained in Baker's Roads and Pavements, Page 175:

"BITUMINOUS CONCRETE. In England a mixture of broken stone and tar, often called bituminous concrete, is sometimes used as a foundation. The only advantage claimed for it is that the pavement may be laid as soon as the foundation is completed and therefore it is more suitable for busy thoroughfares than hydraulic cement concrete. The bituminous concrete is sometimes laid as described in Sec. 709, and sometimes by spreading and rolling the broken stone, and pouring tar over the surface and then covering that with a thin layer of small stones and finally rolling. This foundation is more expensive and less reliable than hydraulic cement concrete.

"ASPHALT MACADAM. Asphalt may be used instead of coal or gas tar, but it will not adhere to the stone unless both are at a higher temperature than that of the ordinary atmosphere. For a method of heating and mixing stone and asphalt (see Sec. 600). On account of the expense asphaltic concrete is seldom used for a pavement foundation.

"695. Very recently it has been proposed to use asphalt as a binding material for crushed stone, the resultant product usually being called asphalt macadam, but sometimes, and less appropriately, bituminous macadam. Doubtless this use of asphalt has been suggested by a former and similar use of coal tar (see Sec. 700). Asphalt concrete would not be an inappropriate name. There are two slightly different methods of applying the asphalt, both of which have been patented. They will be referred to as Warren's and Whinery's after the inventors."

This description then goes on to describe Warren's method of making a bituminous pavement called "*bitulithic*," which,

so far as the foundation is concerned, consists in mixing stone and melted asphalt in a heater. "The mixture of asphaltic cement and stone *is spread while still hot*" (page 177). This is substantially the same method described in the Warren patent, No. 675,430, which is fully discussed by Mr. Browne, pages 225, 226.

The Whinery method appears never to have been used at all.

Mr. Gordon, *defendants'* own witness, clearly points out the distinction between the methods of using hot asphalt, and the Hassam method of grouting with cement (pages 143, 144).

> "With the Hassam they have a kind of a mixer for mixing the sand and cement together, a machine. They *pour it* on to the rock until they fill up all the interstices and spaces full to the surface and then that is rolled again, and they go over it or brush it after it is rolled. In the case of the bitulithic they have a mixture, sometimes gravel and sometimes crushed rock, practically the same material for the base as the other. They have a mixture of asphalt and *while it is hot they put it on about two inches thick.* They roll the base until it is supposed to be six inches deep after it is completed. Four-inch base and a two-inch top dressing and on top of that they put the asphalt mixture.
>
> "Q. Do you know whether there is any difference between the filling put on the two pavements?
>
> "A. Yes, there is. The bitulithic is similar to the cement grout except it is asphalt or bitumen or coal tar, and in the other case they use Portland cement. It is put on as a kind of a sticker, to cement or stick the crushed rock together."

It is open to these defendants to make bituminous pavements by the methods described in these Encyclopedias. It is open to the City of Portland to put in any of these old bituminous pavements without let or hindrance from the complainants.

The cement concrete pavement of Hassam is decidedly a novel and meritorious pavement as compared with any of the bituminous pavements. The Hassam pavement is as distinct from the bituminous pavements as is steel from rubber.

The Circuit Court of Appeals for the Sixth Circuit sustained one of the patents on the Warren bitulithic pavement simply on the point that Warren by using graded stone for the top dressing, was able to make a strong wearing surface which would not require so much of the bitumen or asphalt as the old processes (see Warren Bros. Co. vs. City of Owosso, 166 Fed. Rep., 309).

The Hassam process and pavement is a great deal more of an improvement and advance in the art of making a cement concrete pavement than Warren's was in the art of making bituminous pavements.

As shown by the proofs, the use of cement concrete pavements prior to Hassam was almost negligible. Practically all of the literature and patents offered by the defendants relating to cement concrete pavements, describe experiments and abandoned ideas. The defendants have not shown that there is a mile of cement concrete pavement in use in the United States outside of the Hassam.

The United States Supreme Court in the case of *Carnegie Steel Co. vs. Cambria*, 183 U. S., 983, sustained a patent on a process of making steel which met with great success, over somewhat similar processes employed in making cast iron. The process of making steel and cast iron are much closer than the processes of making bituminous pavement and the Hassam method of making cement concrete pavements.

Mr. Hassam's inventions have brought the art of making cement concrete pavements to success, and no reason is seen why the complainant should not be given the benefit of the protection of the letters patent granted by the Government upon which they made their investment.

C. & A. Potts & Co. vs. Creager, 155 U. S., 596.

" Upon the other hand, we have recently upheld a patent to one who took a torsional spring, such as had been previously used in clocks, doors, and other articles of domestic furniture, and applied it to telegraph instruments, the application being shown to be wholly new. Western Electric Co. v. La Rue, 139 U. S., 601 (35:294). So, also, in Crane v. Price, Webster, Pat. Cas., 409, the use of anthracite coal in smelting iron ore was held to be a good invention, inasmuch as it produced a better article of iron at a less expense, although bituminous coal had been previously used for the same purpose. See also, Steiner v. Heald, 6 Exch., 607.

" Indeed, it often requires as acute perception of the relations between cause and effect, and as much of the peculiar intuitive genius which is a characteristic of great inventors, to grasp the idea that a device used in one art may be made available in another, as would be necessary to create the device *de novo*. And this is not the less true if, after the thing has been done, it appears to the ordinary mind so simple as to excite wonder that it was not thought of before. The apparent simplicity of a new device often leads an inexperienced person to think that it would have occurred to any one familiar with the subject; but the decisive answer is that with dozens and perhaps hundreds of others laboring in the same field, it had never occurred to any one before. The practiced eye of an ordinary mechanic may be safely trusted to see what ought to be apparent to every one. As was said by Mr. Justice BRADLEY, in Webster Loom Co. v. Higgins, 105 U. S., 580, 591 (26 : 1177, 1181): 'Now that it has succeeded, it may seem very plain to any one that he could have done it as well. This is often the case with inventions of the greatest merit. It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of known elements produce a new and beneficial result never attained before, it is evidence of invention.' "

Expanded Metal Co. vs. Bradford, 214 U. S., 365:

> " It is suggested that Golding's improvement, while a step forward, is nevertheless only such as a mechanic skilled in the art, with the previous inventions before him, would readily take; and that the invention is devoid of patentable novelty. It is often difficult to determine whether a given improvement is a mere mechanical advance, or the result of the exercise of the creative faculty amounting to a meritorious invention. The fact that the invention seems simple after it is made does not determine the question; if this were the rule, many of the most beneficial patents would be stricken down. It may be safely said that if those skilled in the mechanical arts are working in a given field, and have failed, after repeated efforts, to discover a certain new and useful improvement, that he who first makes the discovery has done more than make the obvious improvement which would suggest itself to a mechanic skilled in the art, and is entitled to protection as an inventor."

Wickelman vs. A. B. Dick Co., 88 Fed., 264, 265 (Circuit Court of Appeals, Second Circuit):

> " We entertain no doubt that, if the patentee was the first to make a transmitting sheet which, by reason of the peculiar characteristics of the basic material, and of the coating, was new and useful, what he did involved invention, and entitled him to a patent. Inventive thought was involved in the conception that materials could be employed that would dispense with cutting or puncturing instrumentalities altogether. Even if what he did was merely to employ a basic material differing in the degree of porosity and toughness, and a coating differing in the degree of softness, from that which had been previously used, he accomplished thereby a new result. Each of these modifications was necessary to successfully introduce the new principle, which differentiated his production from the stencil sheets of the prior art."

* * * * * *

> "The case is one for the application of the doctrine, well settled in the law of patents, that novelty is not negatived by a prior accidental production of the same thing, when the operator does not recognize the means by which the accidental result is accomplished, and no knowledge of them, or of the method of its employment, is derived from it by any one (Pittsburg Reduction Co. v. Cowles Electric Smelting & Aluminum Co., 55 Fed., 307; Chase v. Fillebrown, 58 Fed., 377; Topliff v. Topliff, 145 U. S., 161, 12 Sup. Ct., 825; Tilghman v. Proctor, 102 U. S., 707, 711).

Diamond Patent Co. vs. S. E. Car Co., C. C. A. Ninth Circuit, October 13, 1914, 217 Fed. Rep., 400–405:

> "The novelty of an invention is not negatived by a prior useless process or thing, nor is anticipation made out by a device which might, with slight modification, be made to perform the same function. The invention must have been complete, and capable of producing the result. One should not be deprived of the results of a successful effort merely because some one else has come near it."

Conclusion.

Counsel begs to apologize for the length of this brief. This has been brought about by the great importance of the case, by the scattering nature of the defenses, by the fact that counsel has had to prepare this brief (owing to his residence in Massachusetts) without the opportunity of seeing appellant's brief to answer every contention, and because the decisions have been freely quoted from.

In this connection, attention is called to the fact that, with the single exception of the case of Warren vs. Montgomery (in which Judge JONES commented upon a piracy of the Warren patent), all excerpts have been made from decisions of Courts of last resort in patent cases, namely, the Supreme

Court of the United States and the United States Circuit Courts of Appeal.

The United States Patent Office officials, the most highly trained experts on the subject, have certified to the existence of patentable matter and have established public grants based on Mr. Hassam's inventions.

Complainants in good faith have invested over a million dollars in establishing a pavement industry under said patents and have made honest and extensive efforts to introduce the inventions into use.

Hassam pavement has been recognized throughout the United States as a new pavement of great value and has been gladly adopted by municipalities who have willingly paid the reasonable royalty asked by the complainants.

Who is it that asks this Court to destroy and confiscate this industry built up in good faith under the patent laws of the United States? No municipality or user of the Hassam pavement has protested against the grants. The parties interested in the defense are unlawful appropriators of complainants' vested property rights, who have knowingly and willfully pirated complainants' patents and taken the chances of litigation. Defendants are competitors of complainants who are anxious to appropriate to their own use some of the commercial advantages which rightfully belong to complainants, as the result of the inventive skill of Mr. Hassam, and the business founded thereon involving years of patient work and a large expenditure of money.

In view of this situation, why should a Court

of equity hesitate for a minute to apply to the case at bar the rule established by a multitude of decisions, finding expression for illustration, in the case of O'Rourke Engineering Const. Co. vs. McMullen (Circuit Court of Appeals, Second Circuit, 160 Fed. Rep., 933-938).

> " The principal question in such case is : Has the patentee added anything of value to the sum of human knowledge, has he made the world's work easier, cheaper and safer, would the return to the prior art be a retrogression ? When the court has answered this question, or these questions in the affirmative, the effort should be to give the inventor the just reward of the contribution he has made. The effort should increase in proportion as the contribution is valuable. Where the court has to deal with a device which has achieved undisputed success and accomplishes a result never attained before, which is new, useful and in large demand, it is generally safe to conclude that the man who made it is an inventor.
>
> * * * * * *
>
> " The keynote of all the decisions is the extent of the benefit conferred upon mankind. Where the court has determined that this benefit is valuable and extensive it will, we think, be difficult to find a well considered case where the patent has been overthrown on the ground of nonpatentability."

Is there any substantial evidence anywhere in defendants' case to warrant or justify the Court in striking down the Hassam patents in suit? Is it not the bounden duty of the Court to sustain the presumption of the validity of the patents,

which presumption is supported by the great weight of evidence and has been so tremendously strengthened by the commercial results arising out of great utility; a presumption which the law has stated, "can only be overcome by convincing proof of a positive character necessary to convict of crime", which proof is produced by the defendants who have assumed burden of proof and against whom the Supreme Court of the United States says, "every reasonable doubt should be resolved."

It would be difficult to conceive of a case where the tests of validity applied by the Courts are more squarely met than in the case at bar. The defendants have raised practically every defense known to the patent law. It would be difficult to find a case where the evidence is more incomplete on any defense. Plain manifest justice protests against striking down the Hassam patents.

It is therefore respectfully asked that the decree of the lower Court be affirmed.

Respectfully submitted,

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CAREY AND KERR,

Solicitors and Counsel for Complainants-Appellees.

HASSAM PAVING CO. ET AL. VS. CONSOLIDATED CONTRACT CO. ET AL.
(District Court, D. Oregon. May 4, 1914.)

CAREY & KERR, of Portland, Or., and LOUIS W. SOUTHGATE, of Worcester, Mass., for complainants.

JESSE STEARNS and JOHN H. HALL, both of Portland, Or., for defendants.

BEAN, District Judge. The time at my disposal will not permit the formation of an elaborate and exhaustive opinion, and I can do nothing more than state my conclusions briefly.

The suit is brought to restrain infringement of letters patent granted to the complainants' assignor for what is known as Hassam pavement. The defense rests on the ground that the patents in question are invalid (1) for want of invention or discovery, and (2) that the defendants have a license to use complainants' patent without royalty because the city of Portland at the request of its agent, specified that the pavement covered by complainants' patent should be used on a certain street in the city, and since the ordinances of the city require that contracts for street improvement shall be awarded to the lowest bidder, and defendant contract company obtained such contract by underbidding its competitors, it is entitled to use the complainants' patent without being liable for infringement thereof.

The granting of letters patent is *prima facie* evidence that the patentee is the first inventor of the device or discoverer of the art or process described in the patent and of its novelty. The burden of proof is therefore upon one who assails a patent for want of novelty, and it is said every reasonable doubt should be resolved against him (San Francisco Cornice Co. vs. Beyrle, 195 Fed., 517, 115 C. C. A. 426).

The patents in question are for an art or process and the methods of carrying it into effect and making it useful, and for claims laid directly on the pavement itself. The manner of constructing the pavement, as described in the patents in brief, is: First, covering the subgrade of the street or road

with a layer of uncoated broken stone and compressing the same by a heavy steam roller, thus reducing the voids to a minimum. Second, after the stone has been thus compressed, it is grouted by pouring over it in place a mixture of cement, sand and water and agitating the same by a steam roller during the process of grouting until the grout flushes to the surface, thus expelling the water and filling up the voids or spaces between the stones with grout. And, third, applying and compressing a wearing surface of uncoated fine or pea stones while the grout is still fresh and before the cement has had a chance to set or harden, so that the surface material is united to the foundation by the cement grout. The pavement, as thus constructed, is then allowed to stand without use until the cement hardens. The result is the building in the street or road itself of a solid monolith or stone structure, differing in this respect from any other known pavement.

It may be and probably is true that every one of the elements going to make up the complainants' pavement had been employed before in road or street improvements, or in other mechanical ways, but not in the same combination and put together in the same manner as Hassam has combined and arranged them. I am of the opinion, therefore, that the defense of want of novelty is not satisfactorily made out. A combination of old elements may be the result of invention and is patentable. National Tube Co. vs. Aiken, 163 Fed., 254, 91 C. C. A., 114; Beryle vs. S. F. Cornice Co. (C. C.), 181 Fed., 692; S. F. Cornice Co. vs. Beyrle, *supra;* Elizabeth vs. Pavement Co., 97 U. S., 126, 24 L. Ed., 1000.

I am unable to distinguish this case in principle from Elizabeth vs. Pavement Co., *supra*, sustaining the Nicholson patent for pavement, or Warren Bros. Co. vs. City of Owosso, 166 Fed., 309, 92 C. C. A., 227, holding valid the Warren patent.

The prior patents relied upon as showing an anticipation of the Hassam patent differ materially from those in suit and do not constitute an anticipation thereof. In the Murphy

patent there is no provision for rolling the stone foundation before the grouting is applied, no grouting consisting simply of cement, sand, and water, no agitation or disturbance of a previously rolled stone foundation to cause the grouting to fill out the voids and expel the air, and no continuous grouting occupying the voids between the foundation stone and serving to bind the surface layer of small stones to the foundation. Moreover, although the Murphy patent was issued in 1881, there is no evidence that any pavement was ever laid under it. It never came into general or extensive use. It is a mere paper patent and should not be held to invalidate the complainants' patent, which the evidence shows to be in common and extensive use (Robins Conveying Belt Co. vs. American Rd. Mach. Co., 145 Fed., 923 ; 76 C. C. A., 461 ; Hall Signal Co. vs. Gen. Ry. Sig. Co., 169 Fed., 290 ; 94 C. C. A., 580 ; American Graphophone Co. vs. Leeds & Catlin, 170 Fed., 327 ; 95 C. C. A., 511). The Bayard, Haggerty and Warren patents relate to roads or pavements made in part of asphalt, tar or some bituminous composition, and, so far as I can see, have no substantial bearing upon the patents in question.

The prior publication consists of extracts from encyclopedias, dictionaries, scientific works and the like, describing various kinds of roads and their construction, and defining some of the elements going to make up the complainants' patent, but they do not describe the complete plant in such a full and intelligible manner as to enable persons skilled in the art to which it relates to make or construct the pavement without assistance from the patent, and are therefore insufficient to invalidate the patents (Seymour vs. Osborne, 11 Wall., 516 ; 20 L. Ed., 33 ; Cohn vs. U. S. Corset Co., 93 U. S., 366 ; 23 L. Ed., 907).

The evidence as to the alleged prior use consists of the oral testimony of the witness Gordon describing, or attempting to describe, some cement pavements or walks which he assisted in laying in England some 40 years ago, and the McClintock experiment. The construction of the pavement

described by Gordon differs materially from the process described in complainants' patent, and, moreover, there is no evidence that it has ever been patented or described in any printed publication, and therefore cannot affect the validity of complainants' patents. R. S., § 4923 (U. S. Comp. St., 1901, p. 3396); Westinghouse Mchy. Co. vs. Gen. El. Co., 207 Fed., 75—C. C. A. McClintock was the city surveyor of Rochester, N. Y., in 1893. Owing to the unsatisfactory condition of the streets, he asked and obtained permission from the city authorities to try an experiment on one of the streets. The experiment was not satisfactory, but, as Mr. McClintock says, "demonstrated that I might have something of practical value, but that I had not carried it far enough or experimented enough at length to demonstrate its practical value." The pavement laid by McClintock was never used elsewhere or tried again. It comes clearly within the category of an abandoned experiment, which is not sufficient in law to anticipate a successful patent. The Cornplanter Patent, 23 Wall., 181, 23 L. Ed., 161; Smith vs. Goodyear Dental Vulcanite Co., 93 U. S., 486, 23 L. Ed., 952; Deering vs. Winona Harvester Works, 155 U. S., 285, 15 Sup. Ct., 118, 39 L. Ed., 153; King Co. Raisin & Fruit Co. vs. U. S. Consol. S. R. Co., 182 Fed., 59, 104 C. C. A., 499.

The fact that the city of Portland saw fit to specify Hassam pavement for one of its streets at the request of the holder of the patent does not excuse one who underbid the owner of the patent, for an infringement thereof any more than if the owner of a rock quarry should induce the city to specify rock for use in a street of a quality to be obtained only from his quarry would justify the successful bidder in appropriating the rock without paying for it.

Injunction will issue as prayed for, and the cause be continued for an accounting. The same order will be entered in the suit against the Reliance Construction Company.

[12387]